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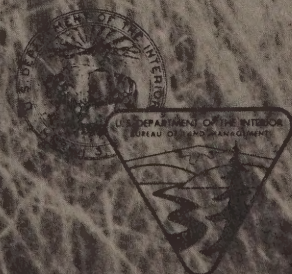
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FORT UNION COAL

CIRCLE WEST III TRACT

SEPTEMBER 1981

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FORT UNION COAL REGION

CIRCLE WEST III TRACT ANALYSIS

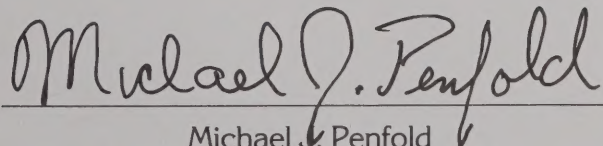
SITE SPECIFIC ANALYSIS

PRELIMINARY FACILITY EVALUATION REPORT

MCCONE COUNTY, MONTANA

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Denver Federal Center
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September 1981



Michael J. Penfold
State Director

PREFACE

This document contains a site-specific analysis and a preliminary facility evaluation report. The site-specific analysis discusses the consequences of leasing and mining a particular tract. The preliminary facility evaluation report discusses significant issues associated with an end use coal conversion facility.

There were 24 tracts identified through a screening process under the over-all direction of the Fort Union Region Coal Team. The team consists of federal, state, and local officials. The tracts are being evaluated for potential federal coal leasing for a coal lease sale scheduled for June 1983. The evaluation, called a site-specific analysis, has been completed for each of the 24 tracts.

Historically, development of a new coal mine in the Fort Union Coal Region has been associated with a coal conversion facility power plant in the vicinity of the mine. For this reason, the Regional Coal Team directed BLM to evaluate impacts of a typical facility near each potential mine. A preliminary facility evaluation report was prepared for each facility.

The Fort Union Regional Coal Team will begin ranking and grouping selected tracts into alternative leasing patterns for the 1983 lease sale using information from these individual reports. These groupings of tracts will form the basis for alternatives and a regional environmental impact statement to be developed during 1982. The analysis in this report represents an important step in a lengthy process which takes place prior to any final decision on federal coal leasing within the region.

Of the 24 tracts currently being evaluated, 16 would require the opening of new mines. One of the 16 would be specifically earmarked for small business. The remaining eight tracts constitute coal which would be needed to maintain production or prevent the by-pass of federal coal at an ongoing mining operation.

Approximately 1.6 billion tons of recoverable federal coal lie within the areas being evaluated. Final designation of some areas as unsuitable for mining under the 1977 Surface Mining Control and Reclamation Act will likely reduce the amount of federal coal actually available for leasing and development, and could remove several of the 24 tracts from further consideration. This information will not be available until early 1982.

A major purpose of the site-specific analysis and preliminary facility evaluation reports is to acquaint the public with key issues and consequences of leasing and development of federal coal reserves so that they may (1) offer comments to the Fort Union Regional Coal Team on what areas they consider most important to be evaluated and analyzed in the ranking of the tracts and in the Regional EIS and (2) offer specific advice on what decision alternatives the Coal Team should look at more closely.

CONTENTS

Site Specific Analysis

Introduction	1
Chapter I — Alternatives	5
Chapter II — Affected Environment	7
Chapter III — Environmental Consequences	17
References	27
Summary Matrix	29
Unsuitability Criteria Results	35

Preliminary Facility Evaluation Report

Goals and Objectives	39
Part One — Assumptions and Variables	39
Part Two — Relationship of Tract and Facility	45

S

SPECIAL ANALYSIS

TE CIFIC YSIS

INTRODUCTION

The purpose of this action is to offer strippable federal coal reserves that can be further considered for coal leasing and development to help meet the energy needs of the Nation.

This site specific environmental analysis has been prepared for the Circle West III tract (see Map 1) in accordance with federal regulations (43 CFR 3420). It will be used by the Fort Union Regional Coal Team to further consider competitive leasing of federal coal within the tract for a June 30, 1983, coal lease sale schedule. If selected and leased, the Circle West III tract will contribute 174.6 million tons of Federal coal to the regional leasing target. Presently, a regional leasing target has not been established by the Secretary of the Interior. The preliminary regional leasing target will be established in August 1981 and finalized in October 1981.

BACKGROUND

In September of 1979, the Miles City District BLM Office completed the Redwater Management Framework Plan (MFP) for Dawson, McCone, Richland and Wibaux counties. The land use planning process included applying unsuitability criteria as much as possible, multiple-use conflict evaluation, and surface owner consultations. As a result of that work, areas were identified that could be further considered for coal development. The areas are available for consideration for new competitive leasing, leasing by exchanging and modifying existing leases (see Map 1).

Following land-use planning, the BLM requested expression of interest which, along with other information, guided the USGS in delineating this tract. Results of that work are summarized in this profile.

Personnel from BLM's Miles City District inventoried the tract to determine the site specific resource values and then analyzed potential environmental effects of coal development on this individual tract. Among other items, the unsuitability criteria (43 CFR 3461) were reconsidered on this site-specific basis. Any new findings of unsuitability are reflected in this report.

To be further considered for new competitive leasing, the tract will be presented to the Regional Coal Team who will rank and select tracts for a proposed lease sale schedule. The proposed lease sale tracts are then analyzed in a regional environmental impact statement (EIS). The EIS will analyze the site-specific and regional cumulative effects of coal leasing and development. Alternatives addressed in the EIS will include different combinations of tracts that meet a regional coal leasing target. The analysis of those groups of tracts could

result in different impacts than the assessment made in this document for this specific tract. During the process this preliminary tract could be modified. Ultimately, the Secretary will select specific tracts for lease sale. If the tract is leased, the lessee will be required to submit a plan for mining and reclamation to the Secretary of the Interior, Office of Surface Mining (OSM) for review and approval within three years after leasing. Once a mining plan has been submitted, OSM will review the proposed developments of the mining plan. OSM will prepare a site-specific environmental assessment or EIS prior to approval of the mining plan.

Development of the tract is in accordance with the federal coal management program adopted by the Secretary of the Interior in June 1979. Basis of the program was, in part, the Final Environmental Statement for the Federal Coal Management Program. Implementation procedures are contained in Title 43—Code of Federal Regulations—Part 3400 (43 CFR 3400). Authorizing actions are The Mineral Leasing Act of 1920, as amended; The Mineral Leasing Act for Acquired Lands of 1947, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act of 1954; the Department of Energy Organization Act of 1977; the National Environmental Policy Act of 1969; the Federal Coal Leasing Amendments Act of 1976; as amended; and federal regulations concerning federal coal leasing and development including 43 CFR 3400; 30 CFR 211; and 30 CFR 700-899.

TRACT DELINEATION REPORT SUMMARY

The Circle West III tract is located in the Great Plains physiographic province and lies approximately twenty miles north of Circle in McCone County, Montana. The tract contains one economical recoverable seam (the "S" bed) of lignite coal.

The seam averages 16.2 feet in thickness with overburden ranging from less than 150 feet to 200 feet in depth. There are no known geological hazards to surface mining in the Circle West III tract.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers and other support equipment. A possible mining sequence for analysis purposes is shown on Map 2. The coal would thus be mined to a depth of 200 feet or until the limiting stripping ratio (20:1) has been reached. The plan indicates the most probable use of the coal would be an on-site liquefaction plant.



PRELIMINARY TRACTSRedwater and Golden Valley

 KRCRA Areas

 Tract Delineation Areas

Total Ft. Union Coal Region

1 Circle

2 Burns Creek-
Thirteen Mile Creek

3 Southwest Glendive

4 Wibaux-Beach

① Circle I

② Circle II

③ Circle III

④ Redwater I

⑤ Redwater II

⑥ Southwest Glendive

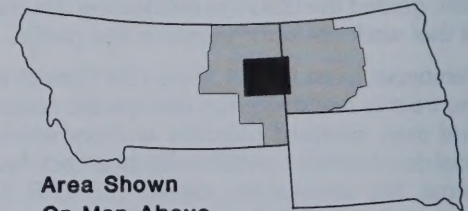
⑦ Bloomfield

⑧ Central Bloomfield

⑨ Burns Creek

⑩ North Wibaux-Beach

⑪ South Wibaux-Beach



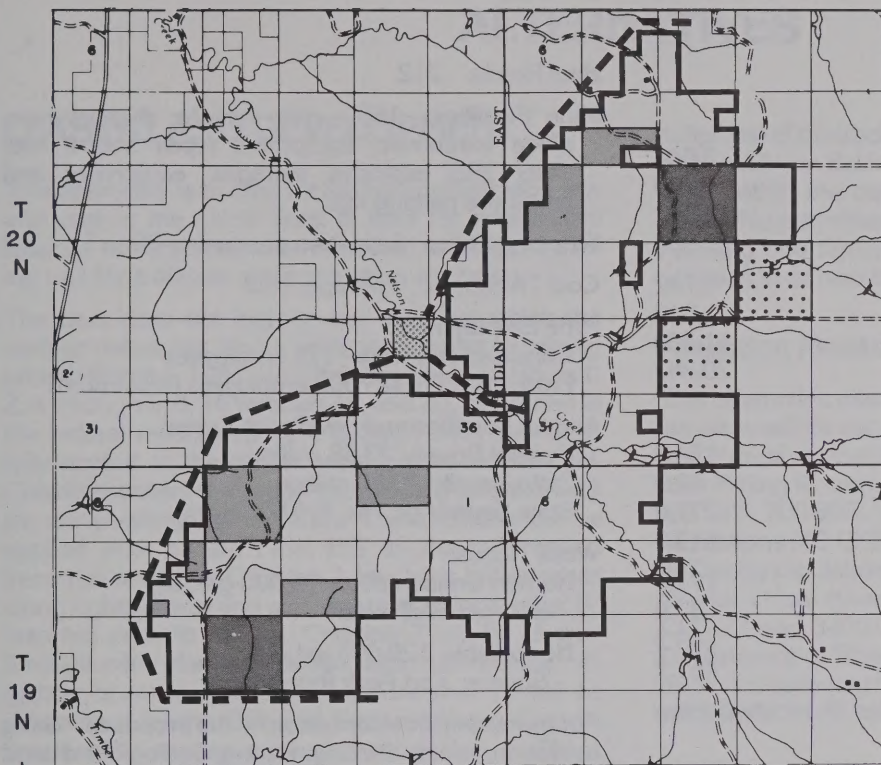
Area Shown
On Map Above

★ Savage Mine

SURFACE

R44E

R45E



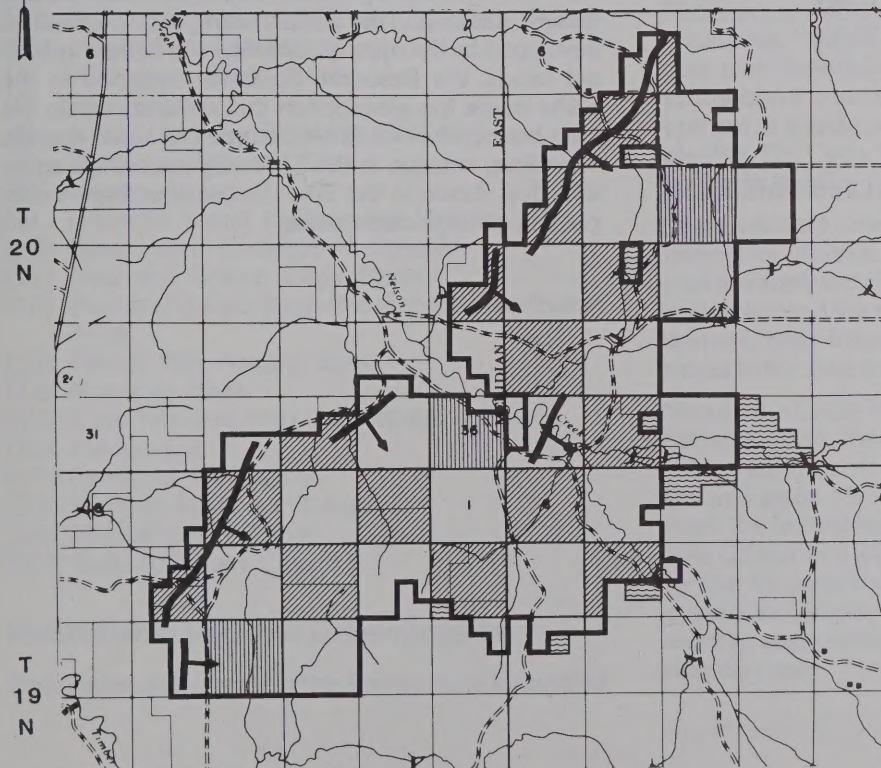
LEGEND

- Federal Surface
- State Surface
- Private Surface
- Surface Owner Nonconsents
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal
- Bypasses
- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

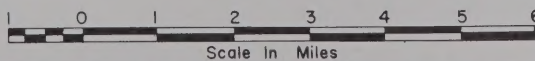
SUBSURFACE

R44E

R45E



**CIRCLE
WEST
TRACT III**



SITE SPECIFIC ANALYSIS

Specific Tract Characteristics:

Acreage:

Surface:	Federal	2,041
	State	1,280
	Private	17,561
	Total:	20,882

Coal:	Federal	7,742
	State	1,840
	Private	11,300
	Total	20,882

Coal Reserves/Millions of Tons:

In Place:	Federal	194.0
	State	42.0
	Private	277.0
	Total	513.0

Recoverable:	Federal	174.6
	State	37.8
	Private	249.3
	Total:	461.7

Coal Quality: Average of samples as received from vicinity of tract:

Moisture	30.8%
Ash	5.9%
Volatile matter	27.3%
Sulfur	0.3%*
Fixed carbon	35.9%
BTU's/lb	7,460

*Contained microveins of pyrite

Surface Disturbance/acres

Mining: Annual rate, 501.4; Total Life of Mine, 18,049

Haul Roads: 212

Mine Facilities: 160 - may include: changehouse, office warehouse, equipment repair shops, fuel, water and explosive storages, equipment and employee parking lots.

Stripping Ratio: Less than or equal to 20 to 1

Coal Thickness: Average, 16.2

Mine Employment:

Construction Phase - 175 employees

Production Phase - 500 employees (maximum)

Annual Royalties and Severance Taxes:

Federal Royalty, \$3.68 million

State Royalty, \$0.80 million

State Severance Tax, \$15.60 million.

Water Needs:

Human Consumption, 15,000 gal./day

Source: Well water

Nonpotable, 120,000 gal./day

Source: Fort Peck Reservoir

For more specific information on the proposed mining operation, refer to the Engineering, Geologic and Land Reports prepared by the USGS Tract Delineation Team.

NOTE: As the mine plans developed by USGS are of a generic nature and the actual mining sequence will be developed by the mining companies to fit their individual needs, the Resource Specialist assigned to the SSAs made the assumption that all lands within the tract boundaries would be disturbed to some degree. Therefore, acreage in the SSA may not always agree with that shown in the Tract Delineation Report concerning acreage disturbance.

CHAPTER I ALTERNATIVES

LEASING AND DEVELOPMENT

This alternative is to offer for further consideration federal coal in the Circle West III tract for competitive leasing. This tract has been identified as a logical mining unit for a 40-year surface mining operation.

The tract does not include any lands for which the surface owner has filed a valid nonconsent to mining prior to March 1, 1981. Unsuitability criteria numbers 1, 2, 4 through 6, 8, 16 through 18, and 20, as defined in the federal regulations CFR Subpart 3461 has been fully applied to the private surface over federal coal. Criteria numbers 9 through 15 involving fish and wildlife are pending further study. These criteria will be applied prior to the Final EIS as the information becomes available. Criterion 3, involving buffer zones along rights-of-way and adjacent to dwellings, must be resolved prior to mining. Criterion 7 will be cleared through mine plan submission, which will include mitigation or avoidance measures. Criterion 19 will be determined by the Office of Surface Mining. Current unsuitability concerns are shown on Map 3. These unsuitability criteria are listed as follows:

- (1) Federal Land System
- (2) Rights-of-Way and Easements
- (3) Buffer Zones along R/W and Adjacent to Communities and Buildings
- (4) Wilderness Study Areas
- (5) Scenic Areas
- (6) Lands Used for Scientific Studies
- (7) Historic Lands and Sites
- (8) Natural Areas
- (9) Federally Listed Endangered Species
- (10) State Listed Endangered Species
- (11) Bald and Golden Eagle Nests
- (12) Bald and Golden Eagle Roost and Concentration Areas
- (13) Falcon Cliff Nesting Sites
- (14) Migratory Birds
- (15) State Resident Fish and Wildlife
- (16) Floodplains
- (17) Municipal Watersheds
- (18) National Resource Waters
- (19) Alluvial Valley Floors
- (20) State Proposed Criteria

Relationship to Other Developments

The nearest active mine is the Savage mine located 80

miles east of the tract. The tract lies on the western flank of the Williston Basin oil and gas field. All of the federal lands within the tracts are subjected to oil and gas leases. No active leases or wells are located in the tract. Farming and ranching are the only other significant activities in or near the tract.

Mitigation Measures

This alternative assumes that proper mining and reclamation will be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement regulation (30 CFR 700-899), Environmental Protection Agency regulations (40 CFR 0-1399), Council of Environmental Quality regulations (40 CFR 211), Department of the Interior's Coal Management Program regulations (43 CFR 23 and 3400), and regulations of the Montana Department of State Lands. No additional mitigation under the authority of the federal government has been identified.

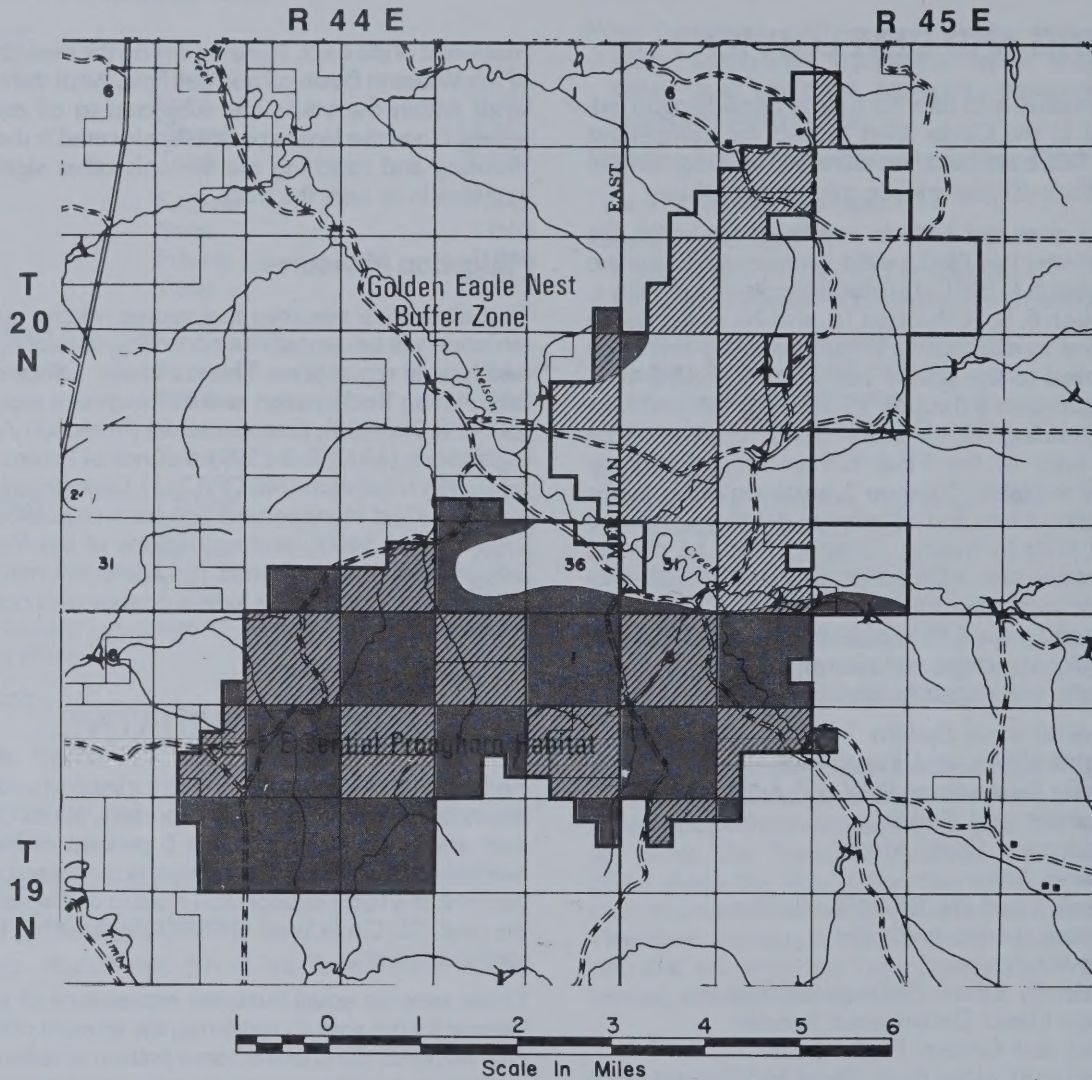
NO LEASING ALTERNATIVE

Federal coal would not be offered for leasing under this alternative. Federal reserves represent about 38 percent and State reserves about 8 percent of the coal available in the tract. If federal coal is not leased, development of a large economical mining unit is not feasible (Ref. GS Circle West III PLMU Engineering Report for Circle West).

There were no small business expressions of leasing interest for the area. Considering the amount of federal coal involved, the checkerboard pattern of federal coal ownership and the apparent trend in small mine development, near future development of any small coal mines in the tract boundary is not likely.

Should the Circle West III tract not be considered for further leasing, there would be about 9 percent (175 million tons) less federal coal available within the Fort Union Region for consideration in tract selection to meet the federal leasing target. Also about 38 million tons of State and 249 million tons of private coal would be lost for possible production in the region. As discussed in Chapter II, few significant changes to the existing environment would be expected during the next 40 years.

CIRCLE WEST TRACT III



LEGEND

Areas that may be declared unsuitable for surface mining based on existing information.

-  By BLM
-  By Others
-  Federal Coal

CHAPTER II

AFFECTED ENVIRONMENT

This section is a description of the current environment with anticipated changes from ongoing trends. Within the Williston Basin there has been an increase in oil and gas exploration and this trend is expected to continue. The physical resources described in this section represent only existing conditions while the social and economic sections account for existing conditions and ongoing trends. It is recognized that the physical resource values may change due to future oil and gas exploration.

TOPOGRAPHY

Surface expression varies from breaks and badlands on the western edge of the tract to gently rolling crop and grassland interrupted by an occasional butte in the remainder of the area. Elevations range from 2660 feet to 3025 feet. Drainage is toward the east through tributaries of Thirteen Mile Creek.

GEOLOGY

The area is underlain by sandstone, shale, and lignite seams belonging to the Tongue River Member of the Fort Union Formation (Paleocene). Some of the higher divides in the area are capped by Flaxville Gravel (Miocene/Pliocene).

Although no discoveries of other minerals have been made within the tract, the area is underlain by formations that are prospectively valuable for oil and gas. No other mineral values are known to occur within the tract.

SOILS AND RECLAMATION POTENTIAL

Soils within the tract are formed on sandstone and shale uplands. These occur along undulating to hilly and steep, dissected sedimentary plains. Profile development and depths vary due to climate, parent material and geomorphic stability.

There are 37 soil series in the tract surveyed by the Soil Conservation Service at level three. The soils are listed in Table 1 with information concerning soil depth, erosion potential, reconstruction potential, etc.

Surface Water

The tract drains to Fort Peck Reservoir through Nelson Creek and its tributaries (Map 2). The southernmost

part of the tract drains to the south by small streams that are tributary to Timber Creek, which also flows northwestward to Fort Peck Reservoir. The streams flow intermittently, mainly in response to summer thunderstorms and snowmelt in February through April. Nelson Creek has flow about 100 days per year and the tributaries are estimated to have flow 30 days or less per year. The estimated annual yield of Nelson Creek at its western intersection of the tract boundary is 1,120 acre feet (AF) from about 60 square miles upstream (based on an average annual runoff of 0.35 inch). The 10-year peak flow at the same point is about 1,780 cubic feet per second (cfs). The chemical quality varies substantially with volume of flow. Storm runoff generally would range from 200 to 800 milligrams per liter (mg/l) in dissolved solids and the water would likely be a calcium bicarbonate type. Low flows, including ground-water inflow, would be considerably higher in dissolved solids, ranging from 800 to 6,000 mg/l and the water commonly is a sodium sulfate type.

Nelson Creek and its tributaries have numerous small dams. The trapped water is used mainly by stock and wildlife. The water from one pond is used to irrigate alfalfa.

Groundwater

Near-surface aquifers in the tract are the alluvium, Tongue River, and Tullock. Both the Tongue River and the Tullock are eroded and exposed to the northwest on the terraces overlooking Fort Peck Reservoir. At greater depth is the Fox Hills-lower Hell Creek aquifer which crops out to the northwest along the shores of Fort Peck Reservoir. Ground-water flow in the near-surface aquifers generally follows the topography and flows toward Nelson Creek and Fort Peck Reservoir. In the deeper Fox Hills-lower Hell Creek aquifer, ground-water flows to the northeast.

Only the Tongue River aquifer is developed by wells in and near the tract. Most wells are no deeper than 200 feet and depth to water ranges from 15 to 160 feet below land surface. The yields range from 3 to 70 gallons per minute (gpm), but most yield 3 to 10 gpm. Eleven stock wells have been inventoried within the tract boundaries and twelve stock wells, two domestic, and two irrigation wells have been inventoried outside the tract but within one mile of the boundary. The ground water from the Tongue River aquifer is a sodium sulfate to sodium bicarbonate type and dissolved solids range from about 1,000 to 4,000 mg/l. Ground water in the Fox Hills-lower Hell Creek aquifer probably contains about 1,000 to 1,500 mg/l dissolved solids and is a sodium bicarbonate type.

TABLE 1
CIRCLE WEST III TRACT
SOIL EROSION

SOIL MAPPING UNIT NAME	DEPTH 1/			PERCENT SLOPE	SOIL EROSION POTENTIAL 1/		SURFACE ACRES	PERCENT OF AREA	SOIL RECONSRT. POTENTIAL 2/	SOIL HAZARD CONDITIONS	SUITABILITY OF SOIL MATERIAL FOR PLANT GROWTH (ACRE FEET) 3/		
	MODERATELY				WIND	WATER					GOOD	FAIR	POOR
	SHALLOW 0-20'	DEEP 20-36"	DEEP 36+"										
Alona silt loam			X	0-4	Low	Low	242	1	Poor	Excess lime and sodium	--	162	1048
Alona silt loam			X	4-8	Low	Mod.	104	1	Poor	Excess lime and sodium	--	69	451
Alona silt loam, saline			X	0-2	Low	Low	270	1	Poor	Excess salts and sodium	--	180	1333
Busby fine sandy loam			X	2-15	High	Mod.	234	1	Fair	Excess lime	159	1011	--
Chinook fine sandy loam													
Busby-Twilight complex		X(.30)	X(.70)	2-8	High	Mod.	71	<1	Fair	Excess lime	33	229	36
Busby-Twilight-Fleak complex	X(.20)	X(.25)	X(.55)	8-15	High	High	38	<1	Fair	Excess lime	18	97	19
Busby-Yetull complex			X	2-8	High	Mod.	9	<1	Fair	Excess lime, too sandy	2	40	2
Cabbart silt loam	X			15-25	Low	High	1571	8	Poor	Excess lime	--	2356	5499
Cabbart-Badland complex	X(.60)		X(.40)	15-45	High	High	6442	31	Fair	Excess lime	1539	7122	3381
Cabbart-Twilight complex;													
Busby-Fleak complex													
Cabbart-Kirby complex	X(.53)		X(.47)	8-45	High	High	518	2	Poor	Excess lime, stoniness	11	663	943
Cabbart-Yawdim complex	X(.90)		X(.10)	4-45	Mod.	Mod.	53	<1	Fair	Excess lime	1	62	37
Cambeth silt loam;			X	0-8	Low	Mod.	3276	16	Fair	Excess lime	2115	7321	6942
Floweree silt loam													
Cambeth-Cabbart Silt loams	X(.35)		X(.65)	8-15	Low	High	1027	5	Poor	Excess lime	329	883	3923
Cambeth-Twilight-Cabbart complex	X(.30)		X(.70)	4-15	Mod.	Mod.	3611	17	Poor	Excess lime	2564	2202	7042
Floweree-Cambeth silt loams	X(.05)		X(.95)	2-8	Low	Mod.	268	1	Poor	Excess lime	89	413	820
Gerdum clay loam			X	0-8	Mod.	Mod.	19	<1	Poor	Excess lime, too clayey	--	6	89
Glendive loam		X		0-2	High	Low	57	<1	Fair	Excess lime	--	285	--
Havre silt loam; Yamac loam; Lonna-Havre			X	0-4	High	Low	408	2	Poor	Excess lime	26	313	1700
Glendive complex													
Kremlin loam			X	0-4	Mod.	Low	134	1	Good		358	312	--
Kremlin loam			X	4-8	Mod.	Mod.	169	1	Good		451	393	--
Lonna silty clay loam;			X	0-8	High	Mod.	1543	7	Poor	Excess lime	155	1878	5683
Yamac loam													
Twilight-Yetull complex	X(.05)	X(.55)	X(.40)	8-15	High	High	169	1	Fair	Excess lime, too sandy	164	348	66
Typic Fluvaquents, saline			X	0-2	Low	Mod.	324	2	Poor	Excess lime	--	--	1620
Ustic Torriorthents - Ustic Torrifluvents association	X(.50)		X(.50)	--	Too Var	High	120	1	--	Too variable to rate	--	--	--
Yamac loam			X	8-15	High	High	22	<1	Poor	Excess lime	4	12	96
Yamac-Twilight complex		X(.30)	X(.70)	2-8	High	Mod.	132	1	Poor	Excess lime	74	101	351
Yamac-Twilight-Fleak complex	X(.10)	X(.25)	X(.65)	8-15	High	High	52	<1	Poor	Excess lime	28	36	102
TOTALS							20883	100			8120	26494	41183

Soil Depths

Shallow - 3%
Mod. Deep - 1%
Deep - 64%

Too Variable - 1%

Soil Erosion Potential

Wind
Low - 35%
Mod. - 19%
High - 45%

Water
Low - 5%
Mod. - 47%
High - 48%

Soil Reconstruction Potential

Good - 2%
Fair - 49%
Poor - 48%
Too Variable - 1%

Suitability of Soil Material for Plant Growth

Good - 7%
Fair - 25%
Poor - 40%
Unsuitable - 28%

1/ Soil Depth Classification and Soil Erosion Potential is derived from McCone County Soil Survey Legend

2/ Soil Reconstruction Potential is derived from the National Soils Handbook.

3/ Depth (in acrefeet) of available soil calculated from acres x acrefeet/acre = suitability of soil material for plant growth.

LAND USES

Vegetation and Agricultural Production

Agricultural operations in this area consist of: (1) livestock and (2) small grains and livestock (see Table 2). Most of the farming in this area is dryland (see Figure 1). A crop-fallow system is used in the dry farmed area with mainly wheat or barley being grown. Small acreage is used for other small grains, forage crops or pasture.

There are currently seven agricultural operators who have some or all of their operation within the tract. However, four agricultural operators have no cropland within the tract (see Table 3). About 8.1 percent of the total cropland of these operators lies within the tract. This pattern varies greatly by operator. For example: the one operator has 24,046 total acres (1,909 acres of cropland) with only 7,739 acres (394 acres of cropland) or 32.2 percent of the operation included in the tract. Another operator has 13,637 acres (2,177 acres of cropland) with only 480 acres (157 acres of cropland) or 3.5 percent of the operation included in the tract and a third operator has 800 total acres (241 acres of cropland) with 560 acres (113 acres of cropland) or 70 percent of the operation included in the tract.

Six out of seven operators have most of their grain and livestock operations outside the tract. As a group, over 77 percent of their operations lie outside the tract. Livestock grazing is the dominant land use, occupying 97 percent of the tract (see Table 3).

Approximately 5600 AUMs of native forage for livestock are produced annually on the tract. The tract area produces 732 AUMs of hay. The same operators produce approximately 2,184 AUMs of hay outside the tract. The acres of cropland are marginal for wintering more than a few head of livestock inside the tract.

The vegetation on the tract is a blending of the Prairie County Grassland and the Central Grassland (Payne 1973). The most prominent subtypes are steppe grassland, silver sagebrush, big sagebrush and riparian shrub.

About 41 percent of the tract is moderately to strongly rolling terrain. The other 59 percent is gently sloping uplands or drainage bottoms. The silver sagebrush and riparian shrub areas are well defined by the drainage patterns. As a distinct subtype, big sagebrush was identified only in the northwest parts of the tract. About 81 percent of the tract is in good condition, leaving 19 percent in fair or poor condition (McCone County Conservation District, 1976).

Residential Homes

No structures exist within the unit other than fences.

Agricultural Economics

This section will be forthcoming under separate cover.

Transportation and Access

Access is available to the unit from State Highway 200, 9.5 miles to the south, and State Highway 24, 4.5 miles to the west, over primitive jeep trails. A spur of the Burlington Northern Railway terminates at Brockway 19 miles to the southeast from the mine facility.

Existing Rights-of-Way (Corridors)

A 230 KV transmission line exists approximately 13 miles northeast from the mine facility. A 69 KV transmission line is located 9.5 miles south along Highway

TABLE 2¹
Agricultural Land Use

Land Use	Tract Acres	Average Production Per Acre	Total Annual Production
Cropland	349	28.4 bushels	9,912 bushels
Hayland	183	1 ton	183 tons
Range	20,219	0.277 AUMs	5,600 AUMs
Other	0	0	0
Fallow	132	0	0
Total	20,883		

¹Data collected from Dawson County Agriculture Stabilization and Conservation Committee, Glendive, Montana, 1981.

TABLE 3

CIRCLE WEST III

FARM/RANCH OPERATIONS 1/

OPERATOR	INSIDE COAL TRACT (acres)							OUTSIDE COAL TRACTS (ACRES)							PERCENTAGE OF THE OPERATION WITHIN THE TRACT
	SMALL GRAIN CROP	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	PERCENTAGE OF TOTAL ACRES LEASED	SMALL GRAIN	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	GRAND TOTAL	
1	226	81	8863	87	0	9257	35.86	1030	13	13274	472	0	14789	24046	38.50
2	0	0	120	0	0	120	0	333	0	5127	183	0	5643	5763	2.08
3	55	102	1436	0	0	1593	42.18	1198	254	10024	568	0	12044	13637	11.68
4	0	0	680	0	0	680	94.12	116	14	1655	89	0	1874	2554	26.62
5	0	0	200	0	0	200	0	231	260	7905	84	0	8480	8680	2.30
6	0	0	8473	0	0	8473	38.25	1570	5	25618	975	46	28214	36687	23.10
7	68	0	447	45	0	560	0	78	0	112	50	0	240	800	70.00
8															
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20															
21															
TOTAL	349	183	20219	132	0	20883		4556	546	63715	2421	46	71284	92167	

1/ Data collected from McCone County Agriculture Stabilization and Conservation Committee, Circle, Montana, 1981.

200. The proposed route of the Northern Tier pipeline is located approximately 3.5 miles northwest and an application (M29680) is on file for a 66-inch water pipeline from Fort Peck Reservoir to the mine facility (see Map 3).

Recreation

Recreation in Circle West III is limited to dispersed, seasonal hunters. Vehicular access into the tract is unreliable. During inclement weather, the dirt roads become extremely muddy. Private landowners control most of the surface property and should be consulted for legal access. There are no recreation facilities within the tract. No wilderness values exist in the area.

WILDLIFE AND FISHERIES

Two endangered species, the bald eagle and peregrine falcon, have been observed on the tract but are believed to be migrants or visitors rather than residents (DNRC, 1978). No other threatened or endangered animals are known to occur on the tract.

Golden Eagles and prairie falcons are permanent residents on the tract. The eagles utilize the entire area and one active eagle nest occurs immediately adjacent to the tract. The eagles also gather in the area during the winter for the good hunting and cover provided by the broken rolling grasslands.

The tract has one sharptailed grouse dancing ground that has had no activity since 1979 and is suspected to have been abandoned (DNRC, 1980).

Pronghorn habitat and resultant populations are the most important wildlife values on the tract. The area shown on Map 3 is year round habitat and contains essential winter range and kidding areas. The pronghorns that winter and are raised on the tract provide a significant portion of the animals for a large area. Exact information on the amount of hunting provided by the herd is unknown but it is a significant amount (Stoneberg, personal communications). The pronghorn harvest data for hunting District 650 which encompasses the tract is listed below (FW&P, 1980).

Year	Total Calculated Kill Region 6	District 650	% of Region	Rank in Region
1977	2,133	616	29	1
1978	948	244	26	1
1979	1,069	130	12	6

The reduced harvests in the last two years reflect the severity of the 77-78 and 78-79 winters which resulted in fewer pronghorn permits being issued. Winter concentrations of mule deer on the tract are significant in

light of the hunting harvest which occurs in District 650. See Figure 1.

Very few white-tailed deer are residents on the tract (DHRC, 1980).

There are no known fish species of special concern on the tract (Needham, 1980). There are no public access fishing ponds managed by state or federal agencies on the tract.

About 80 percent of the tract is drained by Nelson Creek. Timber Creek drains the southwest corner of the tract. Both creeks are rated 4 (Limited Fishery Resource) on a scale of 1 to 5 (MDFW&P, 1980). Both game and forage fish from the Big Dry Arm of Fort Peck Reservoir use the lower sections of this and other creeks as spawning and nursery areas (Needham, 1980).

CULTURAL RESOURCES

The Circle West III tract has not been inventoried to date. Information from existing inventories (BLM unpublished data, Davis, 1976; Greiser, 1980) outside the Fort Union coal region suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80 percent). Other expected prehistoric resources include stone circles (ca. 10 percent-20 percent), ceramic bearing sites, rockshelters and kill sites (ca. 10 percent combined). Expected historic resources include homestead and ranching remains (ca. 50 percent), historic graffiti and rock art (ca. 20 percent), freight roads, dugouts, cairns, trading posts, burials and battle sites (ca. 30 percent combined). Further information on cultural resource occurrence, distribution and significance cannot be quantified prior to inventory.

Industry-sponsored inventory in the Circle West III tract is tentatively scheduled for the summer of 1981 to generate information sufficient to identify and predict the native occurrence and significance of cultural resources in the regional EIS. Subsequent to inventory and prior to the regional EIS, BLM will apply unsuitability criterion 7 (43 CFR 3461.1(g)) to all identified properties and will consult with the Montana State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) regarding the effect of coal leasing on National Register and/or eligible properties in accordance with the ACHP Programmatic Memorandum of Agreement with BLM, OSM, and USGS, and Section 106 of the National Historic Preservation Act (P.L. 89-665 as amended).

VISUAL RESOURCE MANAGEMENT

Circle West III does not exhibit any visual qualities which



Figure 1. Some of the mule deer inhabitants of this tract.

could be defined as unique or outstanding. The central and southern portion of the area is dominated by Nelson Creek and its associated drainages. The northern and eastern portions are flat enough to accommodate some dryland farming. The existing intrusions consist of ranch-related facilities (i.e., fences, reservoirs, dirt trails).

ECONOMICS AND SOCIAL CONDITIONS

Existing and forecasted population and employment levels for the communities of Glendive, Circle, Savage, and Lambert, Montana are shown in Figure 4. As these figures show, future population levels in these communities without energy development (refer to dashed line) are expected to either decline somewhat or remain relatively stable from 1981 through 2000.

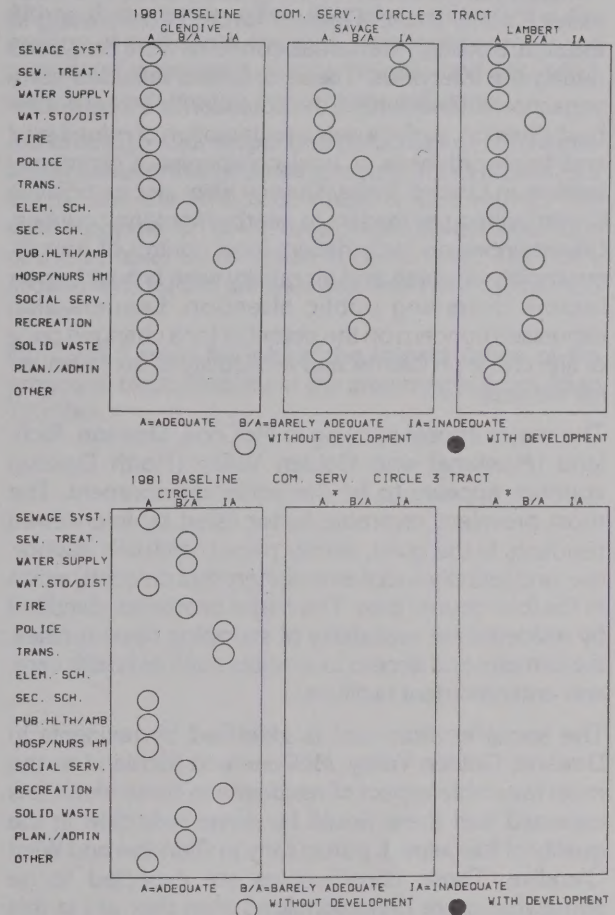
These communities are small agriculturally oriented towns which do not have the capability to accommodate any significant population growth without some strain on public services. As Figure 2 shows, some of the above communities are presently (1981) experiencing problems in providing an adequate or barely adequate level of one or more types of public services. For example, Savage is currently experiencing inadequate sewage treatment and collection facilities for its present population.

Residents in Dawson, McCone, and Richland Counties (Montana) identified similar service needs. In McCone County, retail opportunities, road improvements and maintenance, and recreation facilities and programs were discussed as the major service and facility needs. Retail opportunities, medical care, recreational facilities and programs, along with entertainment opportunities, were identified by persons in Dawson County as problem areas. In Richland County, roads, medical care, retail opportunities, and entertainment opportunities were the major service problems mentioned by residents. In Golden Valley County (North Dakota), the only deficiencies identified by residents were the lack of retail outlets, the school system, and services for the elderly.

In Dawson, McCone, and Richland Counties, the level of support for energy development ranged from roughly 66 2/3 percent in McCone County to roughly 80 percent in Dawson County. In McCone County, where support for local mining appears to be lowest in the three county area, the reasons given for support of such operations include the need for local economic growth, and job opportunities, the Nation's need for energy, and efficient resource use. Opposition to mining was based on potential jeopardy of the community way of life.

Reasons given for stated positions in Dawson County, where thirty-six persons were interviewed and where

FIGURE 2



SOURCE: Respective city/county or regional planners.

support is highest in the three county area, are national energy needs, efficient resource use, and job opportunities. Opposition in Dawson County centered on the need to protect sub-surface water.

National energy needs, local economic growth, and efficient resource use were identified in Richland County (32 persons interviewed) as the reasons for supporting expanded coal development in the area.

In all three counties, the major concern was reclamation of mined land.

Among community leaders in the three county (Montana) area, Richland and Dawson County representatives were much more favorable toward coal mining than were the leaders in McCone County. The majority of interviewed leaders in McCone County were uncertain as to mining. This uncertainty was based on the lack of revenues and the need for orderly development. In Richland and Dawson counties, national energy needs and local economic stability were cited as the reasons for supporting expanded energy production in the area.

A majority of the seven residents interviewed in Golden Valley County (North Dakota) favored coal mining in the area, although numerous concerns were discussed during the interviews. These concerns included compensation to landowners, the potential for a local boom-bust situation, surface water, reclamation of mined land and trustworthiness of coal companies. Community leaders in Golden Valley County were not as positive toward mining as leaders in nearby Montana counties. Uncertainties on reclamation, local control of growth, availability of water, and air quality were brought up as factors deserving public attention. Leaders also expressed concern on the potential for a changed pace of life, crime problems, and availability of tax revenues for the area.

The major appeal in living in McCone, Dawson, Richland (Montana) and Golden Valley (North Dakota) counties appears to be the social environment. The most prevalent favorable factor listed by interviewed residents is the quiet, evenly paced, mutually supportive, and friendly social atmosphere that presently exists in the four county area. The major problems identified by residents are availability of shopping opportunities, the climate, and access to services such as health care, and entertainment facilities.

The social environment is identified by residents in Dawson, Golden Valley, McCone and Richland as the most favorable aspect of residence in these areas. It is expected that there would be some reduction in the quality of this aspect, particularly in Glendive and West Glendive. These communities are expected to be somewhat more depersonalized than they are at this time or would be without development of the Circle West III tract. Increased traffic and noise, conflicts at the personal and community level, and similar changes would likely occur. In McCone County, there would be a two- or three-year period during which some disruptions would be evident. Sidney (Richland County) would not be noticeably affected by development of the tract while Beach (Golden Valley County) would experience a changed social environment due to development of the tract. The addition of 150 persons above baseline forecasts is substantial in a community the size of Beach.

CLIMATE AND AIR QUALITY

The semiarid climate of east central Montana, which is typical of the Northern Great Plains, results from the area's extreme inland location. Rapidly changing meteorological conditions are common because of the movement of Pacific and Arctic pressure systems through the region.

The climate station utilized for meteorological data for the proposed lease tract is at Miles City (Table 4).

The annual mean temperature in the area is 46°F. The

TABLE 4
Meteorological Data for Selected Sites*

	Miles City
Temperature, °F	
Mean Annual	46
Mean Monthly Minimum (Jan.)	15
Mean Monthly Maximum (July)	75
Growing season for Grass (temperature 32°F), days	158
Precipitation, in.	
Annual Average Rainfall	14.2
Monthly Range Rainfall	0.5-3.1
Annual Snowfall	32.2
Average No. of mo/yr with Snowfall	10
Annual Stability (by class), % occurrence	
Class A, B, C	15.8
Class D	54.3
Class E, F, G	29.9
Wind Direction	SE-S, 27% W-NNW, 35%
Windspeed, mph (% of time)	0-3.5 (8.4) 3.6-6.9 (23.3) 7.0-11.5 (39.6) 11.6-18.4 (21.3) 18.5-24.2 (5.5) >24.3 (1.8)
Average Windspeed, mph	10.6

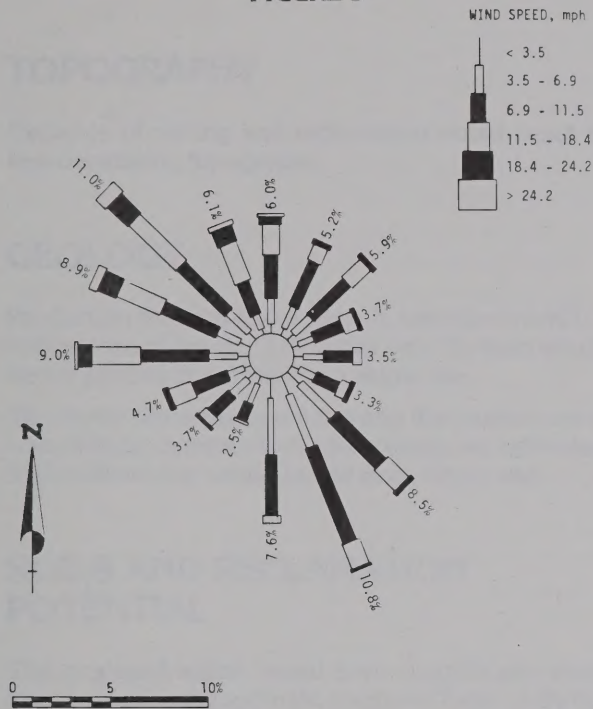
*Sources: National Oceanic and Atmospheric Administration, 1980
Powder River Site Specific Analysis, 1981

highest monthly mean temperature is 75°F (in July), and the lowest monthly mean temperature is 15°F (in January). The growing season averages 158 days at Miles City.

Precipitation in the area is quite light. Most of it is in the form of rain in late spring and early summer. Annual rainfall totals about 14.2 inches, and snowfall about 32 inches.

Wind data used in this analysis were obtained at Miles City, the only station in the area that had data suitable for input into the dispersion model used. The wind rose in Figure 3 represents a summary of these data. Winds are predominantly from the W to NNW 35 percent of the time and from the SE to S, 27 percent. Windspeed averages 10.6 mph annually and exceeds 11.5 mph 28.6 percent of the time.

FIGURE 3



Miles City Wind Rose

Although the terrain offers little obstruction to the dispersion of pollutants, the area experiences prolonged periods of depressed mixing heights and low wind speeds, which tend to concentrate pollutants.

According to total suspended particulates (TSP) monitoring data, annual geometric mean in this area is 25.9 ug/m^3 and the arithmetic mean is 42.5 ug/m^3 . The sparse population in the area precludes consideration of the sampler as an urban impacted site. The background level for this analysis was determined to be 42.5 ug/m^3 .

No Class I areas fall within the impact range of the proposed tract. Visibility in the area ranges from 45 to 70 miles.

CHAPTER III

ENVIRONMENTAL CONSEQUENCES

TOPOGRAPHY

Evidence of mining and reclamation would result in less contrasting topography.

GEOLOGY

Production through life of mine is estimated at 461.7 million tons of lignite. During this time the tract would be temporarily committed to a single use.

The lignite removed by mining and that portion unrecoverable by current mining techniques, an estimated 51.3 million tons, would be lost from future use.

SOILS AND RECLAMATION POTENTIAL

The proposed action would have a significant short-term impact on the soil in the tract (see Table 1). By the end of mine life, 20,883 acres would be disturbed.

Soil impacts include: displacement of soil from wind and water erosion, change in soil structure and natural fertility, soil compaction from haul roads.

In the tract, 45 percent of the soil has a high potential for wind erosion and 45 percent of the soil has a high potential for water erosion (see Table 1). Proper seeding of the stockpiles would reduce this erosion potential.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil. Salinity content would increase as a result of the lower calcareous horizons being brought to the surface.

The soil hazard conditions determine the reconstruction potential. The tract is rated as 2 percent good, 49 percent fair and 48 percent poor for reconstruction. Suitability of the soil material for plant growth is rated as 7 percent good, 25 percent fair, 40 percent poor and 28 percent unsuitable. The clay content of the overburden may be a problem. More sampling and analysis will be required to determine the need for selective handling of the spoils to meet state-federal guidelines (see Table 1). The soils rated poor can be reclaimed, but would require more intensive and costly management to be revegetated and stabilized.

HYDROLOGY

No substantial impact to surface flows is anticipated because of mining or development of additional water for public supply. However, a mining operation would cause destruction of eleven known stock wells within the tract. Mining and use of groundwater from the Tongue River aquifer might lower water levels in the sixteen known wells outside the tract boundaries. The chemical quality in wells downgradient of the tract could be degraded by ground water moving through the mined area following reclamation. Ground water degradation would be a long-term impact.

LAND USES

Vegetation and Agricultural Production

The leasing and development alternatives would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 20,882 acres of the tract would be disturbed, in addition to 160 surface acres used for mine facilities.

An average of 12 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 341 bushels of wheat. This 12 acres of cropland would be out of production ten to fifteen years with a maximum of 94 to 147 acres out of production in any one peak mining year, resulting in a maximum loss of 2,670 to 4,175 bushels of wheat annually.

Peak mining year disturbance of 183 acres of hayland would result in an annual loss of 183 tons of hay production.

An average of 563 acres of rangeland would also be removed from production each year, resulting in an average loss of 156 AUMs. This 563 acres of rangeland would be out of production ten to fifteen years with a maximum of 5459 to 8492 acres out of production in any one peak mining year, resulting in a maximum annual loss of 1512 to 2352 AUMs.

Further analysis of Table 3 reveals that the forage production inside the tract is 24 percent of the combined total production of the seven operations outside the tract. Four of the operators may be large enough to survive the impact of lignite coal mining.

Four operators lease from 36 to 94 percent of their in-tract land holdings. There are 7,872 acres of land leased for livestock grazing in the tract, representing nearly 38 percent of the tract area. Two operators with

no leased land have 2 percent each and one operator without leased land has 70 percent of their total operations inside the tract. The four operators with leases vary from nearly 12 to 38.5 percent of their total operations inside the tract (see Table 3).

Regionally, these losses would not pose significant reductions in area agricultural production. Analysis of economic impacts, both to individual operations and regionally, will be forthcoming under separate cover.

Chief items of concern on the tract are the riparian shrub subtypes. These areas are vital to many wildlife species.

The Montana Department of State Lands will set the standards for establishing a diverse and effective permanent vegetation cover on all rangeland areas, with coordination and cooperation from the Office of Surface Mining and the Bureau of Land Management.

Agricultural Economics

Section will be forthcoming under separate cover.

Residential Homes

None.

Transportation and Access

Access is available to the tract from Highway 24 and 200 over primitive seasonal jeep trails. All weather roads would have to be constructed for access to the mine facility for year round and heavy equipment use.

The major impact on the present transportation system due to mining would be an increase in volume on existing transportation modes. This would result in increased accident rates, system deterioration, rising maintenance costs, and decreased efficiency if not mitigated.

Traffic volume on Highways 200 and 24 would increase proportionately to construction and mining activities. Fluctuations would occur relative to the degree of overlap between mining and construction activities. Traffic is expected to be heavy when shift changes occur.

Recreation

Mining the Circle West III tract would stabilize and improve road access into this tract. Seasonal hunters would be displaced during the mining phase, but would certainly reappear after reclamation. The significant impact to recreation would be felt off-site. The addition of new families (i.e., employees) would undoubtedly create recreation pressures at existing public facilities.

WILDLIFE AND FISHERIES

Mining the tract would have no significant impact on sage or sharp-tailed grouse or white-tailed and mule deer populations as essential habitat does not occur on the tract and alternate habitats are available. The peregrine falcon and bald eagle would avoid the activity area during their migration and would not be impacted.

The golden eagle nest buffer zone will probably be declared unsuitable for surface mining. Displaced wintering golden eagles would probably find adequate hunting territories on adjacent areas.

About 316 acres of mule deer winter range with average winter concentrations of from 1 to 8 mule deer per square mile would be destroyed. The essential habitat for pronghorns (Map 3) will be considered when unsuitability criteria are applied. If not declared unsuitable, there would be significant, long-term impacts. The area is so important that the herd would probably die off. If reclamation is adequate and post mining land use does not change, pronghorns may be able to be reestablished by stocking and careful management. Poaching and road kills have increased dramatically in areas of Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where shift changes coincide with feeding periods, especially big game (Streeter, et al., 1979). The same would probably occur in this area.

Actions to mitigate these impacts available to entities other than BLM, would be to provide mass transportation of workers and adjusting the times of shift changes which would greatly reduce poaching. This has been used successfully in other mining areas (Streeter, et al., 1979). Providing funds for the Montana Department of Fish, Wildlife and Parks for increased law enforcement or adaptation of a poaching clause in union contracts would also help.

Proposed road locations would result in major road kills of pronghorns as well as further destruction of essential habitat. As a result of disturbance and the reductions in wildlife numbers through direct mortality and habitat destruction, recreational opportunities such as wildlife viewing and hunting would be greatly reduced in the area around the mine.

If water quality is not maintained in Nelson and Timber Creeks during mining, the reproduction of game and forage fish in Ft. Peck Reservoir would be reduced.

CULTURAL RESOURCES

Until systematic inventory of cultural resources in the tract is completed, no definitive assessment of impacts

can be made. All cultural resources within the tract would be subject to direct impact from construction of mine facilities, haul roads, power lines, water development, and mining activity. Cultural resources not immediately impacted by the above activities are subject to impacts from increased erosion, access and vandalism. Direct impact would result in damage and destruction to cultural resources, artifacts, their immediate environmental context and the information these contain. Subsurface cultural resources not previously located by surface inventory would also be destroyed.

Should the tract be leased, a mitigation program would be undertaken for all affected cultural resources. Development of avoidance and preservation alternatives is preferred, as these would minimize impact to cultural resources. If these alternatives are not feasible, a scientific program of data retrieval will be developed and implemented for all cultural resources within the tract.

VISUAL RESOURCE MANAGEMENT

There would be little or no impact on visual quality, dependent upon design and elevation of road vistas from Highways 24 and 200. The obvious visual effect would be the disturbance of 20,882 acres for the mining effort. Reclamation would reduce the landscape scars, but impact evidence would linger for years after mining has ceased. Another 372+ acres (out-of-pit) will absorb short range impacts. On this land mining facilities (buildings, shops, office, parking lots, etc.) and associated mining equipment (dragline shovels, bulldozers, haulers, etc.) would be visible on-site. The necessity of an electrical powerline and water pipeline would constitute a visual intrusion which does not exist at present. The whole mining effort would create an air pollution situation (dust) which would require mitigation. Based on low population density, visual impacts would be minimal.

NET ENERGY ANALYSIS

A net energy analysis was calculated using the guidance contained in BLM Washington Office Information Memo 80-640, July 17, 1980. Approximately 37.7 British thermal units (Btus) would be expended to produce a pound of coal. That pound of coal would, in turn, produce about 7,460 Btus. The ratio of energy expended to that energy produced is 1 Btu/198 Btus.

ECONOMICS AND SOCIAL CONDITIONS

Construction and operation of the Circle West III tract

would result in impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 4 shows forecasted community employment and population levels through 2000 both with and without development of the tract. As these figures show, Glendive, Circle, Savage, and Lambert, Montana would experience a significant increase in both population and employment as the result of the development of the tract.

Changes in regional personal income from tract development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employment payroll expenditure and through company expenditures for goods and services during the construction and operation phases. The Circle West III tract is forecasted to boost regional personal income by a maximum of 0.6 percent over baseline values by 1991 and beyond as a result of expenditures associated with the operations phase of this tract.

FIGURE 4

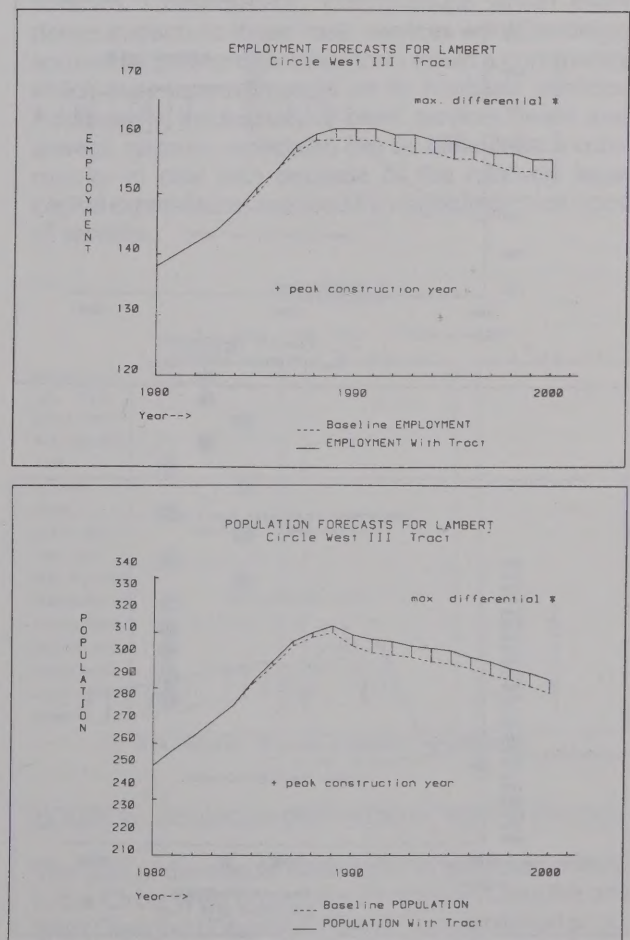
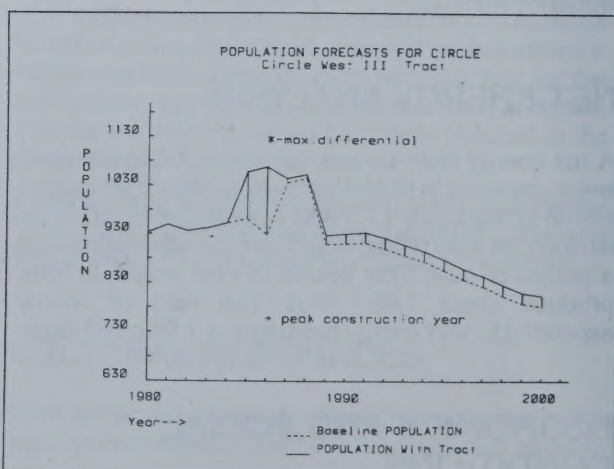
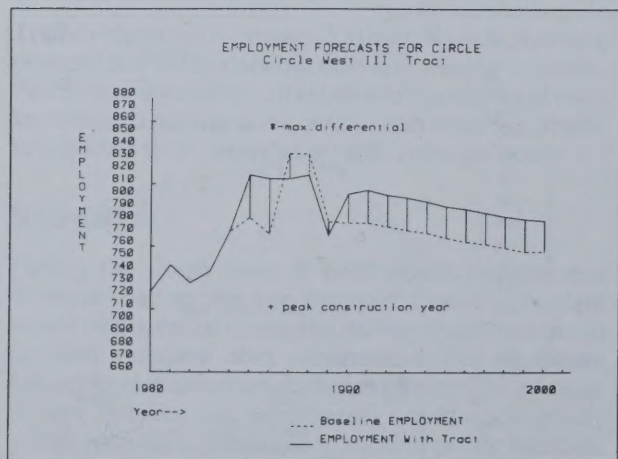
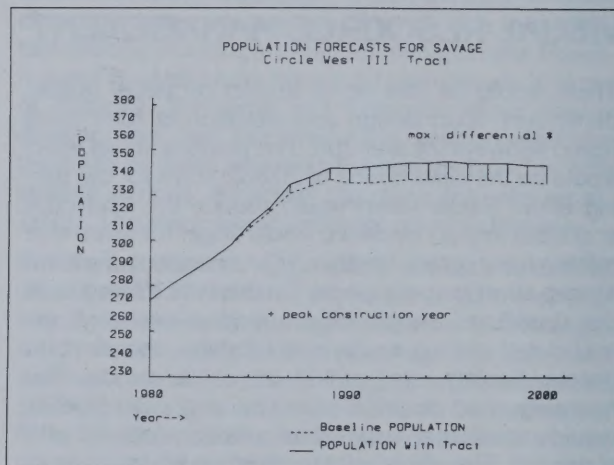
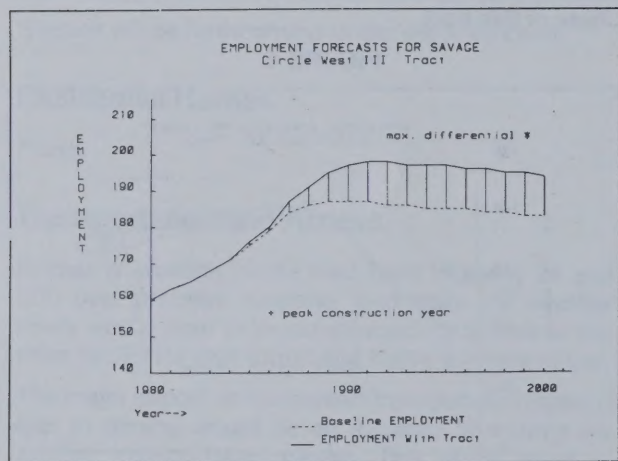
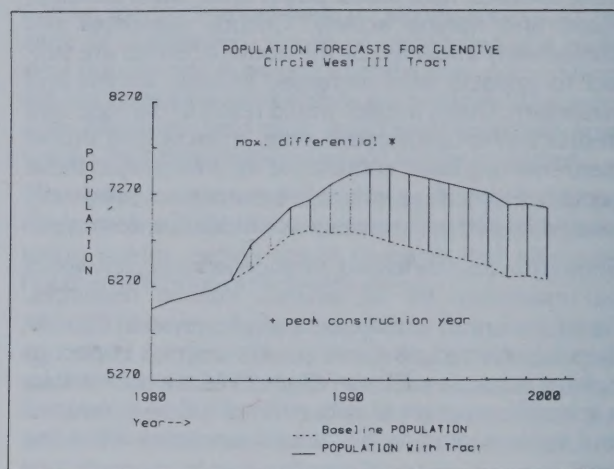
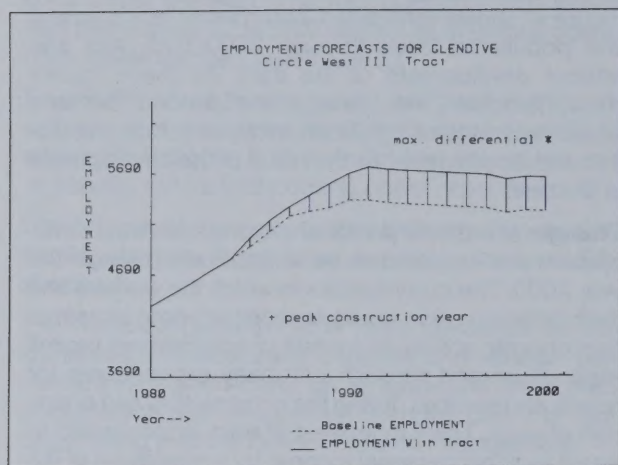


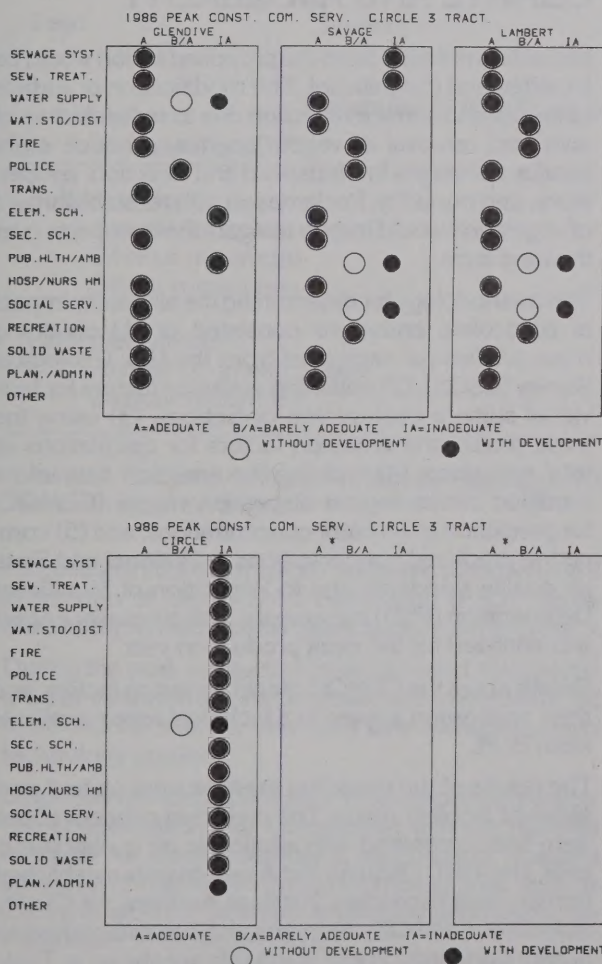
FIGURE 4 (continued)



SOURCE: Mountain West Research, Inc., 1981.

Peak employment during the construction phase of the tract is expected to occur in 1986 at 260 employees with full operations employment expected in 1991 at 425 employees. Using 1986 as the first primary impact date, it is estimated that the communities of Glendive, Circle, Savage, and Lambert would experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels (Figure 5). Glendive, for example, is expected to face an inadequate water supply situation as a result of population growth attributable to the construction of the tract. Additionally, Bloomfield, Richey, Lindsay, West Glendive, Fairview and Sidney would experience an inadequate level of some community services by 1986 without tract development. A tract-related population influx in these communities would further exacerbate an inadequate service situation, however, the inadequacy of these services could not be directly tied to tract development.

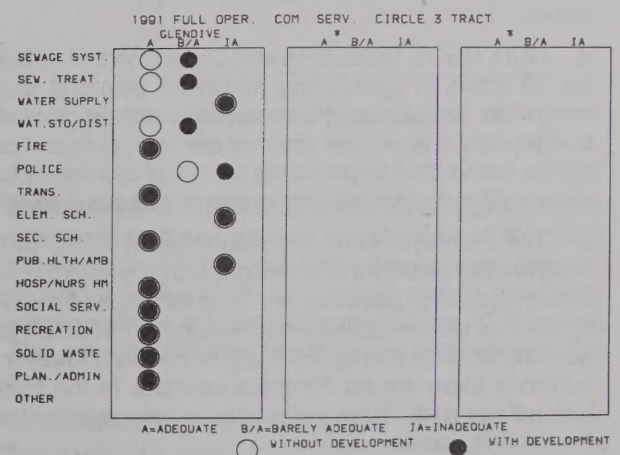
FIGURE 5



SOURCE: Respective city/county or regional planners.

Full operation of the tract (i.e., 1991 and beyond) is expected to result in minor direct impacts on community services. Glendive is expected to experience inadequate police services as a direct result of the population influx resulting from tract operation. However, the following communities in the study area are forecasted to face inadequate public services by 1991 even without development of the tract: Sidney, Fairview, Lambert, Savage, Circle, Lindsay, Richey, Bloomfield, and West Glendive. Development of the tract would further worsen an inadequate service situation. The adequacy ratings appearing in Figures 5 and 6 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners' best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1986 and 1991. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being than are nonbasic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its nonbasic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

FIGURE 6



SOURCE: Respective city/county or regional planners.

The bulk of the effects attributable to proposed mining in the Circle West III tract would occur in Glendive and West Glendive (Dawson County). The combined population increases of this operation would total well over 1000 persons above that projected without mining.

Given the existing diversity and stable population base of Glendive and West Glendive, it appears that the social effects, while important, would not be as disruptive as in other, more exclusively agricultural areas. Relationships among people in relatively large communities, such as the Glendive area, are segmented and formal as compared to more rural areas, such as McCone County.

In McCone County, roughly 150 people above baseline are expected to reside in Circle during the construction phase of tract development. This is a significant number of new residents, but the increase would last only for a couple of years. In the mid-1980s and thereafter, the population increase falls to insignificant levels. Sidney, in Richland County, and Beach, in Golden Valley County, are also expected to experience minimal levels of disruption. In each case, roughly 150 additional persons are expected to reside in these communities. However, given the differential in size, the local social effects of 150 persons in Beach are substantially different and greater from those to be expected in Sidney.

Mitigation of social and economic impacts can be accomplished through several technical and/or financial categories from both federal and state sources. These include:

1. Mountain Plains Federal Regional Council Energy Impact Office. This office has several functions designed to alleviate impacts on counties and communities, including: (a) provide information about and facilitate applications for technical and financial assistance, (b) develop and participate in workshops for state, local, federal, and industry people on impact assessment and mitigation, (c) encourage and facilitate development of local energy impact assessment task forces.
2. HUD, USGS, DOE, EPA and Department of Labor are all active in sponsoring advanced planning and mitigation assistance. However, because of federal budget cuts, it is unclear whether any federal agencies will be committed to providing technical assistance to state and local governments in energy impacted areas.
3. The Farmers Home Administration (FmHA) 601 Program provides grants to designated (approved) coal impact areas for planning, site acquisition, and development of public facilities and services in addition to housing on sites owned by a city or county. However, currently there are no Montana counties in the Fort Union Region which are designated as being eligible for FmHA 601 monies.
4. States currently receive 50 percent of the federal mineral leasing royalties. This money could be used to mitigate impacts in those areas which are impacted by federal mineral development.
5. Montana Department of Commerce (formerly the Department of Community Affairs (DCA)) provides direct technical assistance to communities in the coal

resource areas of eastern Montana. This assistance includes workshops and training sessions in local planning and impact assessment, growth management and impact mitigation techniques, funding sources for planning and public facilities and others.

6. The eastern Montana field office of the Department of Social and Rehabilitative Services is available to assist eastern Montana communities assess and plan for human service impacts.

7. Funding by the Montana Coal Board is available to local governments which have been required to expand the provision of public services as a consequence of large scale development of coal mines and coal-using energy complexes. These funds originate from an 8.75 percent portion of the revenues from Montana's coal severance tax.

Technical reports are available which discuss the methodology used in the economic or social analyses.

CLIMATE AND AIR QUALITY

Impacts on climate from the proposed action would be localized and insignificant. The modification of surface contours and surface reflection due to redistribution of soils and removal of vegetation may produce slight localized changes in windspeed and direction, temperature, and humidity. Reclamation with reestablishment of vegetation would largely mitigate these impacts over the long term.

The methodology for determining the air quality impact of particulate emissions consisted of (1) obtaining mine profiles for each tract from the U.S. Geological Survey (USGS), (2) obtaining emission factors for individual surface coal mining operations, (3) using the mine profile and emission factors for calculations of total emissions, (4) entering the emission data into a modified climatological dispersion model (CDMQC) for prediction of ambient concentrations, and (5) comparing predicted concentrations to National and State air quality standards and to Prevention of Significant Deterioration (PSD) increments. The air quality impact was analyzed for the peak production year.

Details about the CDMQC model, emission factors, and their application appear in a technical report available from BLM.

The results of the modeling exercise were plotted on a series of isopleth maps. The predicted concentrations were then compared with applicable air quality standards. The 1970 Clean Air Act Amendments established primary and secondary National Ambient Air Quality Standards (NAAQS). Montana also has established air quality standards. These standards are shown in Table 5. The Montana primary standard for total suspended particulate is the same as the corresponding Federal standard.

TABLE 5
Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards		Montana State Standards	
		ug/m ³	ppm	ug/m ³	ppm
Sulfur Dioxide	Annual (Arithmetic)	80	0.03	60	0.02
	24-hour	365	0.14	260	0.10
	3-hour			650	0.25
Total Suspended Particulate	Annual (Geometric)	75		75	
	24-hour	260		200	
Carbon Monoxide	8-hour	10,000	9		
	1-hour	40,000	35		
Photochemical Oxidant	1-hour	240	0.12		
Nitrogen Dioxide	Annual	100	0.05		
Lead	3-month	1.5			

Prevention of Significant Deterioration (PSD) Regulations

Class II area	ug/m ³
Sulfur Dioxide	
Annual Arithmetic mean	20
24-hour maximum	91
3-hour maximum	512
Particulate matter	
Annual Geometric mean	19
24-hour maximum	37

Source: National Ambient Air Quality Standards 1970; Montana State Department of Health and Environmental Sciences.

All pollutant sources must be evaluated to determine if Prevention of Significant Deterioration (PSD) regulations apply. These standards are also shown in Table 5.

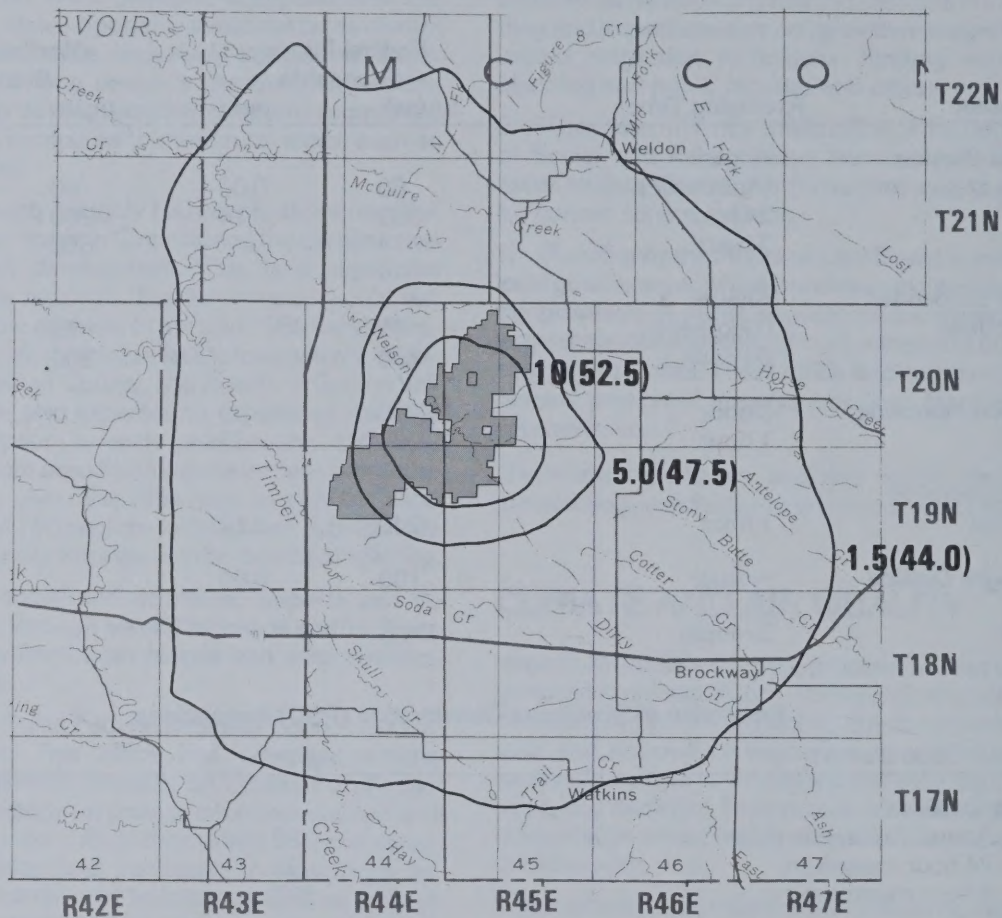
During the peak production mining period, total particulate emissions from the proposed action are predicted to be 4753.0 tons per year, with best available control technology applied.

Dispersion modeling was performed to predict particulate concentrations for comparison with the National Ambient Air Quality Standards and State of Montana standards. Areas within the active mining area, such as the mine facilities, pit areas, and reclamation areas, are not subject to these standards.

The isopleth lines on Figure 7 indicate annual geometric mean average particulate concentrations that will result from implementation of the proposed action.

During peak coal production, the highest annual geometric mean concentration at a location off the mine site would be 15.0 ug/m³. With a background concentration of 42.5 ug/m³, the highest annual geometric mean ambient concentration would be 57.5 ug/m³. This value is less than the Montana particulate standard.

In addition to the annual particulate standard, Montana has a 24-hour standard of 200 ug/m³ that cannot be exceeded more than once a year off the mine site. Figure 8 shows predicted 24-hour maximum particulate concentrations that would result from the proposed action. The isopleths represent a composite of 24-hour levels; therefore, the values occur over the year period indicated rather than simultaneously. Twenty-four hour maximum values with the proposed action during full coal production would be as high as 42.9 ug/m³ during

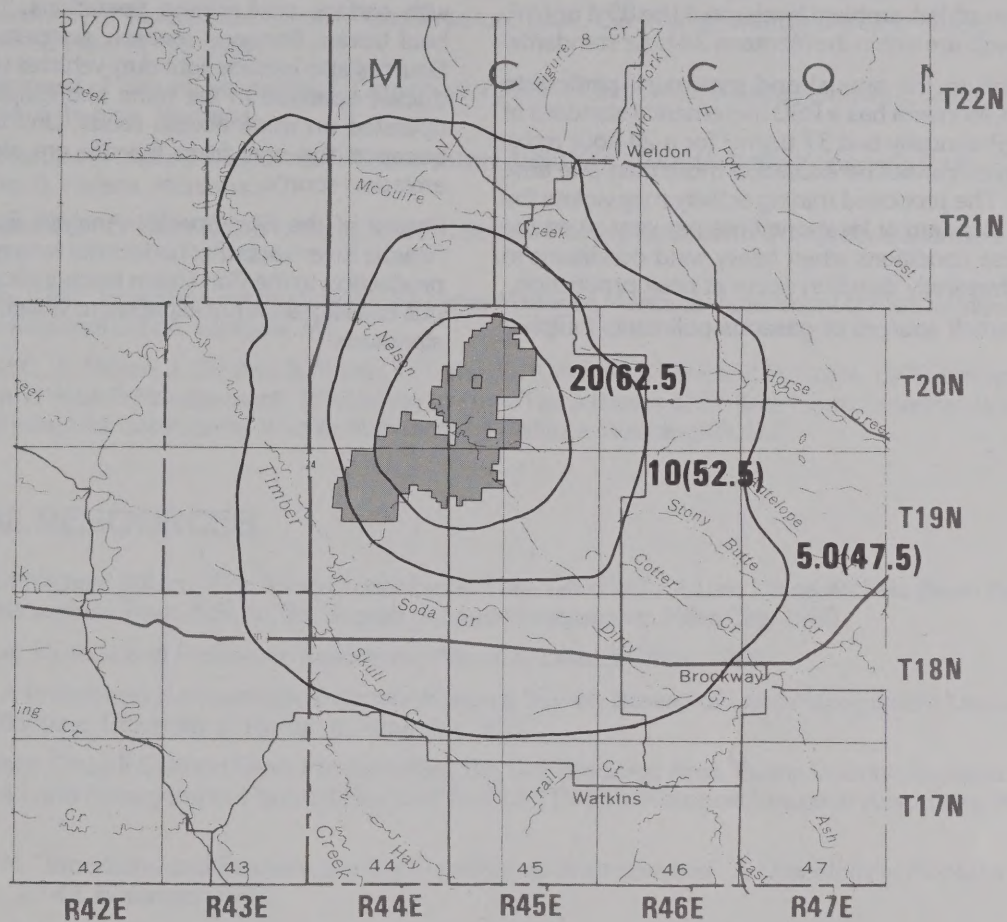


Circle West III Tract

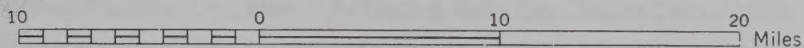
TSP Annual Average Concentration ($\mu\text{g}/\text{m}^3$) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 7



Scale 1:500,000



Circle West III Tract

TSP Maximum 24-hour Concentration ($\mu\text{g}/\text{m}^3$) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 8

SITE SPECIFIC ANALYSIS

the end of mine life period. With the background concentration added, ambient levels would be 85.4 ug/m^3 . These levels are within the Montana 24-hour standards.

In addition to the annual and maximum particulate standard, Montana has a PSD incremental standard of 19 ug/m^3 annually and 37 ug/m^3 for a 24-hour maximum which cannot be exceeded more than one time per year. The proposed mining activity may violate the 24-hour standard at least one time per year given the worst case conditions when heavy wind conditions in the southwesterly direction occur at peak production.

Several small sources of gaseous pollutants (sulphur

dioxide, ozone, and nitrogen dioxide) are associated with surface coal mining operations. These include haul trucks, front-end loaders, scrapers, and dozers. Sources also include light-duty vehicles (chiefly pickup trucks) operated in the mine and employee vehicles operated on mine access roads. Unit trains used to transport the coal from the site are also a gaseous emission source.

Review of the Site Specific Analysis Reports for the Powder River tracts that had similar tons per year of coal production to the Fort Union tracts indicates that gaseous emissions are not expected to violate any air quality standards.

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SUMMARY MATRIX

CIRCLE WEST III TRACT

Resource and Environmental Considerations

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Topography	Gently rolling with broad sloping valleys. Narrow divides separated by steeply incised drainages.	Less contrasting topography with original drainage patterns reestablished. Less contrasting divides and wider, flatter drainages. Original drainage pattern would be reestablished.	Very low.	Good	
Geology and Minerals	Tract is underlain by formations that are prospectively valuable for oil and gas. There are no known wells on the tract.	None	None	Acceptable	
	Tract contains 513.0 million tons of coal	Loss of 51.3 million tons of coal for future use by current recoverable techniques.	Low	Good	
Soils and Reclamation Potential	There are 37 soil series in the tract mapped at level II in a survey done by Soil Conservation Service. The soils are found along undulating to hilly and steep, dissected sedimentary plains.	There will be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility.	Significance of the impact will be high. Reconstruction potential is rated as 49 percent fair and suitability of soil material for reclaimability is rated as 40 percent poor and 28 percent unsuitable.	Data reliability is 90 percent from the McCone County Soil Survey.	
Hydrology Surface Water Quantity	The tract is drained northwestward to Ft. Peck Reservoir by Nelson Creek & its tributaries. The southernmost part of the tract is drained southward by tributaries of Timber Creek. Both flow in response to thunderstorms and snowmelt. The estimated annual yield of Nelson Creek at the western boundary of the tract is 1120 Ac. Ft.	No substantial impact to surface flows is anticipated.	Small	Fair-Good	
Groundwater Use in Tract	11 stock wells exist within the tract, all completed in the Tongue River aquifer.	All wells will need to be redrilled after mining if needed.	Moderate cost to mining company to redrill wells.	Good	Groundwater in the reclaimed spoils is expected to have dissolved solids content 1000 to 3000 mg/l higher than the ground-water.

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Quantity	In near-surface aquifers groundwater flows toward Nelson Creek & Ft. Peck Reservoir. In the deeper aquifer, groundwater flows northeastward. Yields from wells in tract range from 3 to 70 gpm but most yield 3 to 10 gpm.	Mining might lower the water levels in 12 stock wells, 2 domestic, and 2 irrigation wells outside the tract but within 1 mile of the boundary.	Possibly significant if water levels drop in nearby wells, especially the domestic wells.	Good	
Quality	Groundwater from Tongue River aquifer is a sodium sulfate to sodium bicarbonate type & dissolved solids range from 1000 to 4000 mg/l	The chemical quality in wells downgradient of the tract could be degraded.	Possibly significant if chemical quality degradation occurs in domestic wells.	Good	
Vegetation Rangeland Types: Prairie Co. Grassland with influences from Central Grassland (Payne, 1973)	Native vegetation covers 97% or 20,219 acres of the tract. Primary land use is by livestock, with small cropland areas. Vegetation provides food & habitat for wildlife, retards erosion, and improves air & water quality.	Vegetative Subtypes and Acres to be Disturbed: Grassland - 13,332 Big Sagebrush - 580 Silver Sagebrush - 5,836 Riparian Shrub - 471 Total Acres - 20,219	High - due to long-term elimination of established plant communities and reduction of species diversity. Reservoirs and shallow underground waters will be highly impacted by surface mining.	Data Reliability 95% from the McCone Co. ASCS Committee. Reliability determined by cross-checking data received. There is no data at present as to the kinds and number of wildlife that depend on the vegetation on the tract.	Many native plant species may be lost through mining. The impact may be lessened by immediately respreading topsoils. Impacts will extend past the 40-year life of the mine.
Livestock forage in Animal-Unit-Months or AUMs (McCone Co. Average)	Average production is 5,600 AUMs.	Average annual loss of 156 AUMs. Each acre would be out of production from 10 to 15 years. Maximum loss for any one peak mining year would be 5459 to 8492 acres and 1512 to 2352 AUMs.	Moderate to high depending upon individual operation. Low to moderate for overall tract.	Grazing data from the McCone Co. Conservation District's Long Range Program, circa 1976.	
Threatened or Endangered Plants	There are no reports of threatened or endangered plants in the coal tract area.	Low	Low	Good	No plants in Montana have been accepted as yet by the FWS for inclusion on the Threatened or Endangered Plants List.

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Noxious weeds	There are 6 noxious weeds in the Circle Planning Unit. Only Canada Thistle & Leafy Spurge have been reported on or near the tract. The other plants are: Russian Knapweed Field Bindweed White top Snowy Milkweed	Low to Moderate	Low to Moderate	Data obtained from the Circle Planning Unit documents developed in 1978.	The impact depends on whether mining operations disturb noxious weeds before or after seed has been produced and how topsoils containing noxious weed roots are handled.
Agriculture	There are 664 acres of land in the tract that are currently being cropped.	Average annual loss of 12 acres excluding 132 total acres of summer fallow. Annual production on this 12 acres would be 341 bu. of wheat. Maximum loss in any one peak mining year would be 94 to 147 acres and 2670 to 4175 bu. of wheat.	Moderate to high depending upon individual operation. Low to moderate for overall tract production.	Data reliability is 95% from the McCone County Agriculture Stabilization and Conservation Committee. Reliability of data determined by cross-checking data received.	
Land Use	No industrial activity. Ranching is primary use. Little or no farming. No residential homes.	Introduction of industrial activities. Land required for mines, roads, railroads, pipelines, and powerline rights-of-way. Land required for housing development and related support.	Moderate during mining. Low to none after reclamation.	Good	Existence of power lines, rail lines, and industry may encourage further development of area.
Recreation	No facilities in tract. The only recreation activity is seasonal hunting. Road access not reliable.	Improved road access to site. Displacement of seasonal hunters during mining phase.	Mild	No research or studies done in area.	
Wildlife Endangered Species Bald Eagle & Peregrine Falcon	Migrate through area.	Insignificant	Insignificant	Good	
Mule Deer	300 acres of mule deer winter range.	Will be destroyed.	Insignificant	Good	Essential habitat just off tract.
Sage grouse	Unknown.	Unknown	Unknown	Non-Existent	Should occur in Pronghorn area.
Golden Eagle	1 nest immediately adjacent to tract	If buffer area declared unsuitable, low	Insignificant if declared unsuitable. Significant if not.	Good	

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Pronghorn	Year round habitat plus essential winter range, kidding and recreation area.	If declared unsuitable, insignificant. If not, long-term significant impact. Herd would disappear.	If declared unsuitable, insignificant. If not, herd will be destroyed and there will be no recreation opportunities now being provided by herd.	Good Good	
Fisheries	Water in Nelson and Timber Creek used for spawning and nursery areas for Ft. Peck Reservoir	Game and forage fish in Ft. Peck Reservoir would be reduced.	Low-Moderate. Big Dry Arm of Ft. Peck Reservoir is a very important recreation area and is a National Wildlife Refuge. Fisheries would be reduced.	Good	
All other species	Insignificant	Insignificant	Insignificant	Good	
General					Increased poaching and disturbance would significantly reduce all wildlife populations in the region. If not controlled it would significantly reduce recreation opportunities.
Cultural/ Historical Values	Tract not inventoried to date. Industry-sponsored inventory tentatively scheduled for 1981. Expected prehistoric resources include lithic scatters (70-80%), stone circles (10-20%), ceramic-bearing sites, rockshelter kill sites (10% combined). Expected historic resources include homestead and ranch remains (50%), historic rock art (20%), freight roads, dugouts, cairns, trading posts, burials and battle sites (ca. 30% combined).	Direct impact to all cultural resources in the tract.	Damage and destruction to sites, artifacts, their immediate environmental context and the data these contain.	Poor for tract.	Expected resources in tract have been extrapolated from the literature on reported sites in the Fort Union KRCRAs and inventory surrounding the Fort Union region (BLM unpub., BLM 1980; Davis 1976; Greiser 1980; Johnson 1977; Reeves 1970).

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Wilderness	N/A	N/A	N/A	N/A	N/A
Visual Resource Management	Rolling prairie with numerous drainage coulees dumping into Nelson Creek. Mostly grasses with some dryland farming. All intrusions related to range industry.	Disturbance to 21,372 acres, plus visual impacts related to mining facilities and equipment. Powerlines and water pipe will add off-site intrusion. Dust pollution.	Short term- extreme Long term- high	Fair	
Climate and Air Quality	Excellent	Minimal background addition. All standards will be met except the 24-hr. PSD standard for TSP may be violated at least one time per year under certain conditions.	May be significant	Fair	

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Economics and Social Conditions

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Population/ Employment	Population/ employment numbers appear in a stable or small increasing trend.	Increases in: Glendive Circle Savage Lambert	Population/ employment increases are high/moderate in Circle, moderate in Glendive, low in Savage.	Good	See population and employment graphics in Chapter3 for more detail.
Regional Personal Income	Regional Personal Income forecasted to increase moderately through the year 2000.	Slight increase in Regional Income from tract construction and operation.	Insignificant	Fair	
Infra- structures	Most services are adequate or barely adequate in Circle, Glendive, Savage, Lambert.	These communities would have 1 or 2 services which would become inadequate as a direct result of tract development.	Glendive - moderately high impact on water supply. Savage and Lambert - moderate/high impact on Pub.Health/Amb. Moderate impact for Social Services Circle - Moderate/ low impact on Elem. schools.	Excellent	See Community Service graphics in Chapter 3 for greater detail.
Resident Perception of Community Services	Problem areas: McCone: a) roads b) recreation Dawson: a) medical b) recreation Richland: a) roads b) medical c) entertainment Golden Valley: a) schools b) services for elderly	N/A	N/A	McCone-Fair Richland-Good Dawson-Good Golden Valley-Fair	
Social Attitudes	Majority of respondents in Dawson, McCone, and Richland were in favor (conditionally) of coal development. More conditional responses in Golden Valley but still generally in favor.	N/A	N/A	McCone-Good Richland-Good Dawson-Good Golden Valley-Fair	
Quality of Life	Relaxed social environment cited most often by respondents as most favorable aspect.	Some depersonalization and increased tensions are expected to result. Significant deterioration in McCone County.	Significant	McCone-Good Richland-Good Dawson-Good Golden Valley-Fair	

CIRCLE WEST III TRACT UNSUITABILITY CRITERIA RESULTS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	Applied	N/A	N/A	No federal land systems found within the tract.
2. Rights-of-way and easements	Applied	None	None	Applied to Federal surface and/or private surface over federal coal.
3. Buffer Zones	Pending	N/A	Yes	Requires agreements w/local governments and private owners of dwellings.
4. Wilderness study areas	Applied	N/A	N/A	No wilderness study areas found within tract.
5. Scenic areas	Applied	N/A	N/A	No scenic areas found within tract.
6. Land used for scientific studies	Applied	N/A	N/A	No lands used for scientific study were found within the tract.
7. Cultural and historical sites	Pending further study	N/A	Yes	Applied upon completion of inventories (Dec., '81)
8. Natural areas	Applied	None	None	No designated natural areas within the tract.
9. Federally listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
10. State listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
11. Eagle nests	Pending further study	N/A	Yes	To be applied in Dec. '81.
12. Eagle roosts and concentration areas	Pending further study	N/A	Yes	To be applied in Dec. '81
13. Falcon cliff-nesting sites	Pending further study	N/A	Yes	To be applied in Dec. '81
14. Migratory birds	Pending further study	N/A	Yes	To be applied in Dec. '81

SITE SPECIFIC ANALYSIS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
15. State resident fish and wildlife	Pending further study	N/A	Yes	To be applied in Dec. '81
16. Flood plains	Applied	None	None	No significant flood plains were found within the tract.
17. Municipal watersheds	Applied	None	None	No municipal watersheds were found within the tract.
18. National resource waters	Applied	None	None	No national resource waters were found within the tract
19. Alluvial valley floors	Applied	N/A	None	No drainages within the tract qualify as AUFs.
20. State proposed criteria	Applied	None	None	No State criteria

PRELIMINARY FACILITY EVALUATION REPORT

GOALS AND OBJECTIVES

The Fort Union Regional Coal Team, in its consideration of leasing federal coal, will address the likely coal end-uses and their implications. The purpose of evaluating how the coal will be used is to present the most probable major impacts of development.

The end-use facility evaluations are at a reconnaissance level and the reports are presented only as general approximations of facility characteristics and impacts.

The uncertainty of actual end-use facilities and the inherent problems in defining a "typical facility" limit end-use analysis to broad generalizations. The evaluations are not meant in any way to substitute for detailed site specific evaluations, EISs, or analyses which come later when mining and facility projects are actually proposed. The end-use facility evaluations will not preclude any federal, state, local, or private decisions concerning actual end uses, facility siting, or end-use restrictions. The end-use reports are meant only to provide additional information to be used in decisions concerning the leasing of federal coal in the Fort Union Region and should not prejudice any later decisions.

End-use evaluations, referred to as preliminary facility evaluation reports, have been prepared for those tracts for which a new coal-use facility is expected to be built. One of the three proposed end-use facilities has been assigned to those tracts based on expressions of interest, tract size, or existing facilities. The typical facilities to be considered are: a 250 million standard cubic feet per day gasification plant; a 1,000 megawatt electric power generation plant; and an 85,000 barrel per day indirect coal liquefaction plant.

Part I of the report summarizes what the assigned typical end-use facility might be like. The description of the facility gives plant size, process technology, plant requirements (fuel, land, water, power), emissions, and other characteristics of facilities likely to be proposed in the Fort Union Region. The description includes ancillary facilities and a discussion of construction and operational aspects of the facility that are relevant to determining impacts that could occur in the vicinity of the tract.

The facility description is based on existing analyses, studies, environmental impact statements, and consultation with State and industry representatives. Part II of the facility report is an analysis of the facility impacts on the tract area.

The preliminary facility evaluation reports will be used by the Regional Coal Team to rank federal coal tracts with a better understanding of likely future development impacts and implications.

PART I

Assumptions and Variables

The typical indirect liquefaction facility characteristics based on numerous assumptions and reasonable values for important variables. Some of the assumptions and variables are based on best estimates. Others are based on existing literature, facilities, and on input from industry sources.

Facility Location, Type, and Size

Because of the economics of lignite coal, it was assumed in the early stages of the Fort Union coal leasing process that the end-use facilities would be near the tracts to be leased. The energy value of lignite coal as well as the water content make the transporting of lignite for long distances uneconomical. For purposes of issue level impact analysis, the indirect liquefaction facility assigned to the Circle West III tract is not specifically located but assumed to be near the tract. Such an assumption will eliminate the problems of arbitrarily siting facilities. Facilities were sited, however, for the air quality modeling. Where specific site location information was available from potential project developers, it was used in the facility analysis. The typical indirect liquefaction facility would produce 85,000 barrels per day of methanol. The plant would use the Lurgi gasification process. The synthetic gas would then be converted to methanol. Based on industry proposals for liquefaction facilities, this indirect liquefaction process of coal to gas to methanol will be the prevalent process used in the region for at least the next 10 to 15 years. Many of the assumptions concerning indirect liquefaction are based on the Nokota Company's proposed methanol plant.

Construction Period

The construction time span for a synfuel facility can vary greatly. A company hiring four to five thousand construction workers could complete the proposed facility in as short a time span as three years. A company could choose to lengthen the construction period or build parts of the plant capacity in two or more construction phases. This would reduce the construction work force and spread construction over as many as ten years.

The assumption is that the typical facility will be constructed in phases. The typical indirect liquefaction facility will be assumed to have a two phased construction period with each phase lasting four years. The construction of one phase would result in partial plant capacity in operation earlier, enabling the company to

generate an early return on their investment. Construction of one phase should provide the company with technical information, enabling them to make modifications in the second phase.

Employment

The construction work force will be a function primarily of the construction schedule. Work force numbers were supplied by the Nokota Company. While the Dunn-Nokota Methanol Plant is scheduled for a five-year construction period, the generic methanol facility will have the same construction schedule and work force as the generic gasification plant.

Water Requirements

Water demands for an indirect-liquefaction facility depend on production technology, operation time, and water quality. The values used for water requirements are based on estimates from Nokota. The value for gallons per minute is an estimate of average water use for the facility. The yearly requirements are an approximation based on an operation factor assumed for the facilities. This operation factor indicates the time the facility will be in operation each year. For analysis purposes, water for the methanol plant is assumed to come from the Fort Peck Reservoir.

Emissions

The air emissions for the methanol plant will depend primarily on the facility's production process, the amount and quality of coal burned, the level of pollution control, and whether or not the facility produces its own electric power.

An important assumption is the source of a facility's electric power. The proposed generic facilities would require from 100 to 150 Megawatts of electric power for peak plant operation. It will be assumed that the indirect liquefaction facility will produce its electric power on the plant site with coal-fired boilers and steam turbines.

An assumption affecting air emissions from a generic facility is the quality of the coal. The sulfur, ash, and water content of the lignite will not only influence emissions per ton of coal burned, but will also determine the amount of coal required for a given facility. The amount of coal required for a generic indirect liquefaction facility could vary from 11 to 14 million tons per year depending on the coal quality and certain process characteristics.

The air emissions from any type of coal conversion facility will be a function of the conversion process characteristics and the emission control technology used at the facility and the level of control used. The possible variation is evident when the emission rates for the Great Plains Coal Gasification and Nokota facilities

are compared. The two facilities will produce approximately equivalent amounts (BTU values) of gas and methanol. The emissions for the two facilities are expected to vary considerably, due to the difference in the level of emission control planned for each facility.

The impacts resulting from air contaminants emitted by the coal end-use facility are deduced by using established air quality standards above which deleterious effects of the contaminants are implied to occur. A facility's ability to meet air quality standards assumes there would be no significant deleterious effects to human health, animals or vegetation. Such an assumption is the subject of continuing discussion and is disputed by certain research studies. A more detailed discussion of this issue can be found on pages 37-94 in the Final West-Central North Dakota Regional Environmental Impact Study on Energy Development (October 1978). The facilities could also emit certain pollutants for which there are no standards. The anticipated levels of air quality concentrations of contaminants are obtained by measuring existing levels of air quality and adding computer simulation of the atmosphere loading resulting from the end use facility.

The air quality impacts are considered in terms of ambient air standards and prevention of significant deterioration standards. Under authority of the Clean Air Act of 1970, the State of Montana has promulgated its own ambient air quality standards. The purpose of the Montana Ambient Air Quality Standards is to control the quality of the air over Montana such that a) the health of sensitive and susceptible segments of the population will not be adversely affected; b) concentration of pollutants will not cause public nuisance or annoyances; c) significant damage to animals, ornamental plants, forest and agricultural crops will not occur; d) visibility will not be significantly reduced; e) metals or other materials will not be significantly corroded or damaged; f) fabrics will not be soiled, deteriorated, or have their colors affected; and g) natural scenery will not be obscured. Montana's ambient air standards are generally more stringent than the federal EPA standards, and they include a number of criteria for which there are no EPA standards, such as visibility (Class I areas only), hydrogen sulfide, and fluoride.

Under authority of the Clean Air Act Amendments of 1977, Prevention of Significant Deterioration (PSD) standards apply to all areas that are in compliance with federal standards for particulate matter and sulfur dioxide. PSD establishes three air quality classes. Class I areas allow only a small incremental increase in pollution beyond existing conditions in the area at the time of designation. The bulk of the United States was designated Class II, which allows for well-planned growth and some additional pollution, although within limits that are well below the standards. Class III applies to areas of industrial growth and permits incremental increases in pollution up to, but not exceeding, the standards. Since 1974, Congress, the states and Indian tribes have been

eligible to petition EPA to classify areas Class I and Class III, providing that various specified procedures are followed. Wilderness and certain other specially managed areas in existence before August 1977 received automatic Class I designations, and the Northern Cheyenne Tribe requested and received Class I status for its reservation in mid-1977.

The federal Clean Air Act states that pollutants originating in Canada are to be included in calculating the existing air quality of neighboring regions of the United States for purposes of enforcing the PSD standards, unless the governor of a state takes action to exclude such pollutants.

After March 1979, the states were to be responsible for administering the PSD regulations and for processing redesignation petitions. However, due to changes in the federal rules, PSD delegation for Montana has not yet been approved. The Air Quality Bureau is presently evaluating procedural alternatives for PSD administration.

An in-depth analysis of air quality impacts resulting from facilities associated with certain coal lease tracts was impossible. Discussion of site specific impacts without addressing the interactive and cumulative impacts would have little decision value. For the purpose of this analysis, the end use facility which has been assigned to the coal lease tract will be discussed. This discussion will contain general statements regarding facility impacts on the air quality. The impact analysis is based on standard dispersion computer modeling using the worse case situation. The analysis is in terms of compliance or noncompliance with ambient air quality standards or PSD standards. A limited analysis of this type cannot be substituted for a detailed permit review. Care must be taken to use this information with the proper qualifiers and should not be taken out of context.

Solid Wastes

Estimates of solid wastes from the facility are based on figures from Nokota. Estimates for ash and sludge could vary considerably depending on the ash content of the coal and the pollution control technology used. Planned facilities are proposing to dispose of solid wastes in the nearby mines.

INDIRECT LIQUEFACTION FACILITY

Introduction

The typical lignite coal liquefaction plant would use an indirect liquefaction process to produce methanol from

synthetic gas. The facility would produce an average of 85,000 barrels of methanol and 3,000 barrels of gasoline blending stock each day. The indirect liquefaction complex situated near its coal source, would consist of the following major units: 1) coal preparation, storage, and handling; 2) gasification units; 3) methanol synthesis units; 4) process facilities; 5) pollution control facilities; and 6) ancillary facilities. See Figure 1.

The plant layout for an indirect liquefaction facility would be very similar to that described for coal gasification. The only major difference would be the addition of methanol synthesis units which would require no significant additional space.

The total land area dedicated to the indirect liquefaction plant site would be about 960 acres. Major structures would include: 1) gasifiers/methanol synthesis units; 2) coal preparation facilities; 3) boiler plant; 4) boiler stack; 5) compression building; 6) other buildings—administration, shops, warehouse; 7) ponds for clarified water storage, process water, and storm water catch basin; and 8) distillation and absorption columns.

Lignite received directly from the nearby mine by truck or conveyor would be crushed, sized, and sent to storage piles. When needed, the coal would then be resized, weighed, and sent by conveyor either to the gasification unit or to the steam generation area. The supporting utilities would include steam generation and distribution, power generation and distribution, oxygen production, raw water supply and water treatment, and fire protection. The wastewater treatment system would be designed for maximum reuse within the plant. No wastewater would be discharged to surface waters. Gaseous waste streams would be treated prior to discharge from a 500-foot stack. Waste solids from coal processing, wastewater treatment units, and from the ash handling system would be dewatered and disposed of at the mine. By-products would be recovered, stored, and either consumed in the plant or sold. Water from a nearby source would be used in the gasification process, in steam generation, in cooling, and for plant utility and sanitary purposes. There would also be a product pipeline to transport the methanol away from the facility.

Employment

The construction of an indirect liquefaction facility would be completed in consecutive phases. Phased construction would involve building one half of the plant's capacity in about four years followed by a four-year construction period for the second half. Construction employment will peak late in the third year with approximately 3,000 workers. Table 1 shows average yearly employment. Once the facility is in full operation, it would employ about 900 workers.

Figure 1
METHANOL SYNTHESIS

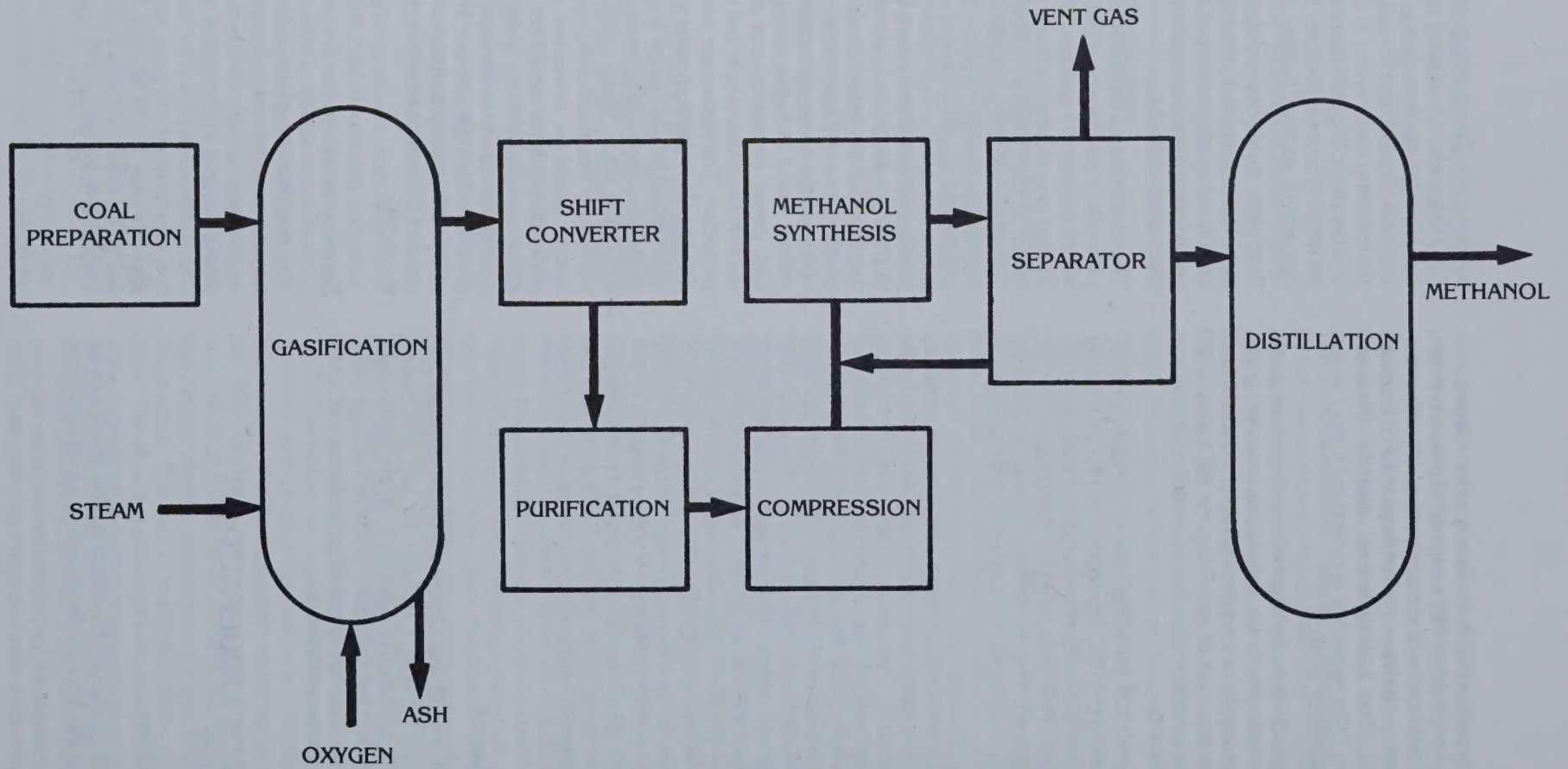


TABLE 1
AVERAGE YEARLY EMPLOYMENT

Year	1	2	3	4
Construction	230	1376	2617	2192
Permanent			440	580
	5	6	7	8
	567	1388	2094	1317
	580	580	580	900 etc.

SOURCE: American Natural Resources Company, the Nokota Company.

Coal Preparation, Storage, and Handling

After crushing, weighing, and sampling, the lignite coal would be conveyed to either an active or inactive storage pile. The inactive storage pile would amount to a 30-day supply and would only be used during extended shutdowns in the mine. The live storage pile would feed the plant on a day-to-day basis. The indirect liquefaction plant would require approximately 14 million tons of coal to be mined each year. See Figure 2.

Gasification Process

The gasification/methanol process uses the same gas production technology as the gasification facility. In the gas production section, coal, steam and oxygen are reacted under conditions of controlled temperature and pressure to produce a crude gas containing methane, hydrogen, carbon monoxide, carbon dioxide, excess steam and various by-products and impurities. Before leaving the gas production section, the hot crude gas is cooled and scrubbed to partially remove impurities. The ash is sent to disposal. The crude gas from the gas production section is split into two streams. One stream is sent to the shift conversion section. The other stream bypasses the shift conversion section and is sent to the gas cooling section. The shift conversion section adjusts the hydrogen-carbon monoxide ratio in the crude gas stream. The shifted gas is then also sent to the gas cooling section. In addition to lowering the temperature of these two gas streams before they are combined, the gas cooling section also removes more by-products and impurities from the feed streams for processing in the gas liquor section. The combined gas streams are sent to the gas purification section which removes naphtha and acid gases (carbon dioxide and hydrogen sulfide). The stream is then sent to the methanation section. The function of the methanation section is to upgrade the heating value of the gas feed stream from the gas purification section. The upgraded synthesis gas is then passed once more through the gas purification section.

The methanol synthesis unit produces 85,000 barrels per day of methanol using the Lurgi methanol process. The gas is combined with recycle gas and heated to the reaction temperature then fed to the methanol converter. The converter effluent is cooled, and the liquid

methanol, separated from the gas, is sent to the drying section where the water content is reduced.

Process Facilities

The main boiler plant for the gasification facility would generate steam to drive turbines for electric power generation, to drive compressors and large pumps and to supply process steam for coal gasification. A 500-foot stack would disperse flue gases from the steam boilers, the super heater, and other heaters. Steam generated in the high pressure boilers will power extraction condensing turbines driving the three air compressors in the oxygen plant. The steam from the air compressor turbines will be combined with steam generated in the methanation waste heat boilers. This steam will then be supplied to the gasifiers and to the turbine drivers. Average operating electric power requirements would be approximately 150 megawatts. The oxygen facilities would provide gaseous oxygen to the gasification process. Raw water would be piped in from a nearby water source. Pump capacity would be installed to meet the normal plant operating requirements of approximately 7,800 gallons per minute. The facility would require approximately 11,500 acre feet of water each year. Raw water entering the plant will be processed in a clarifier. Water not sent to the cooling towers will be filtered further for plant use.

Emission and Pollution Control

The two principal sources of gaseous effluents at the facility—gaseous waste streams from the gasification methanol process and the combustion flue gas streams—will be treated to reduce the concentrations of SO₂ with a scrubbing system and particulates with electrostatic precipitators. Gaseous streams containing hydrocarbons will be incinerated. The steam boiler flue gas will be treated prior to being combined with the other gas streams for discharge via the common stack.

TABLE 2
AIR EMISSIONS (lbs/hr)

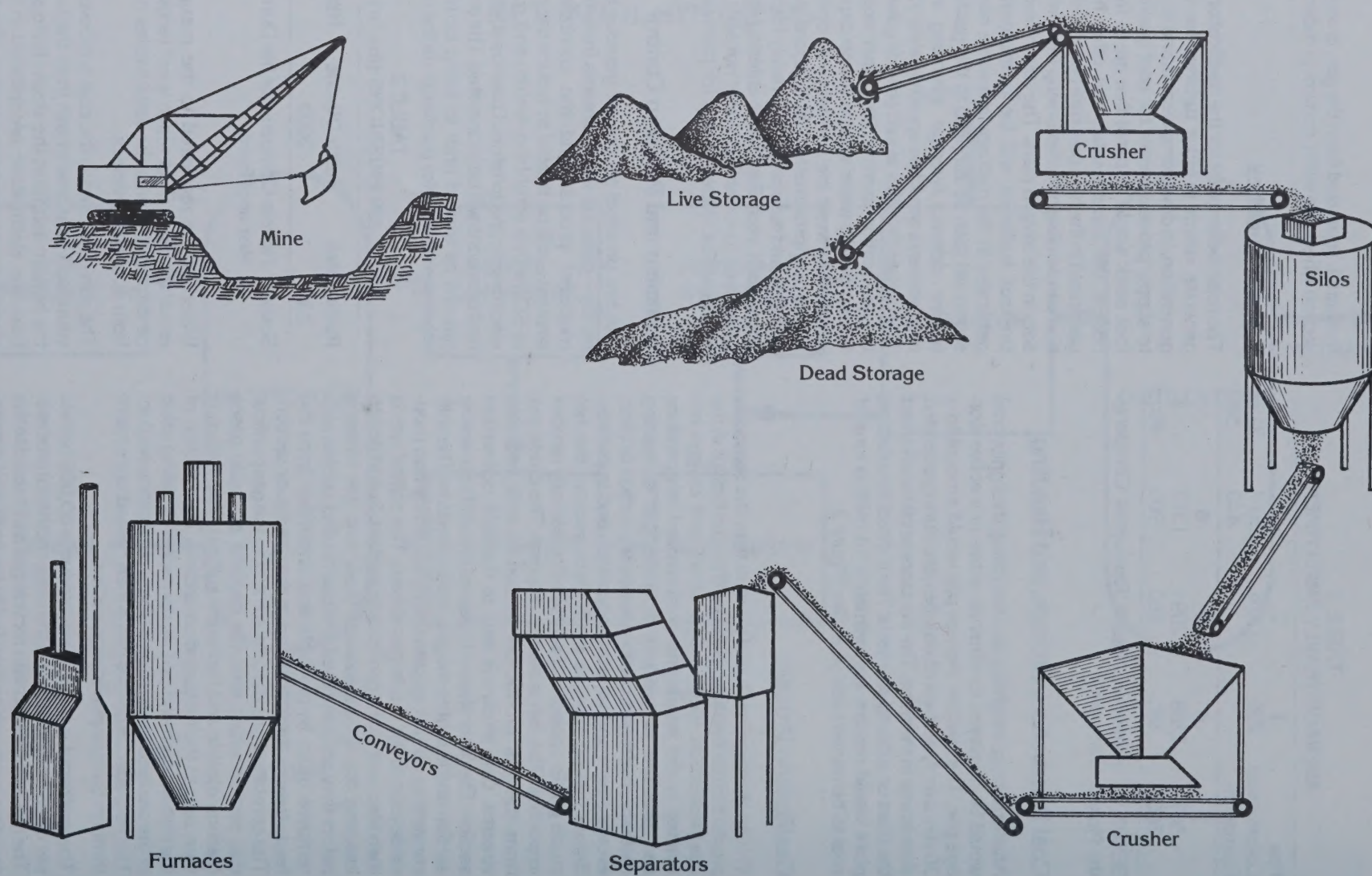
Particulates	Sulfur Dioxide	Nitrogen Oxides
230	2600	4420

Source: Nokota Company for the Dunn Center Methanol Plant.

Water will be recovered to the maximum possible extent for reuse. That which is not recovered will either be disposed of with the solid wastes or lost as vapor from cooling processes.

The ash contained in the coal is recovered from three sources: 1) the gasifier ash from the Lurgi gasifier; 2) the bottom ash from the steam boilers; 3) the fly ash from the electrostatic precipitators in the steam and electric power generation section. The gasifier ash and the boiler bottom ash are conveyed to the dewatering

Figure 2
COAL HANDLING SYSTEM



facilities which separate the ash and water. The de-watered ash, a free flowing solid containing 20 percent water, will be disposed of at the mine. The recovered water is recycled to the ash sluiceway. The fly ash is collected by electrostatic precipitators. This ash is sprayed with water to prevent dusting as it is withdrawn from the storage silo. It will then be disposed of at the mine.

TABLE 3
SOLID WASTE (tons/hr)

Dry Ash	Dry Sludge	Water
117	14	44

Source: Nokota Company for the Dunn Center Methanol Plant.

Ancillary Facilities

Suitable loading and unloading facilities would be provided to ship and receive materials by either pipeline, truck or rail. Storage would be provided in suitable closed tankage. There would be handling (and storage) facilities for the following major materials: methanol, caustic soda, sulfuric acid, propylene, phenols, gasoline blending stock, ammonia, sulfur, and creosotes.

A railspur would connect the facility with an existing rail system. The spur would have a 150-foot right-of-way. Rail loading and unloading facilities would be provided for by-products. The water pipeline will require a right-of-way 100 feet in width for construction and 50 feet wide permanently.

PART II

Relationship of Tract and Facility

The Circle West III tract lies approximately twenty miles north of Circle in McCone County, Montana. The tract consists of 20,882 acres of land with recoverable coal reserves of 461.7 million tons.

The likely use of coal mined from the tract would be for an indirect liquefaction plant. To consider the impacts of this coal facility, it is assumed that the typical indirect liquefaction plant described in Part I would be constructed adjacent to or near the tract with no specific site designated, except for purposes of air quality analysis.

Soils, Vegetation and Agriculture

In the Circle West III tract area, the agricultural land consists of approximately 1 percent cropland and 99 percent rangeland. Based on 1978-1979 county averages determined from ASCS data and from BLM grazing files annual production per acre would average 28.4

bushels per acre of wheat, 1 ton per acre for hayland and .277 AUMs per acre for rangeland.

Assuming the same agricultural land use distribution for the 960 acre disturbance estimated for a generic indirect liquefaction facility, annual agriculture production foregone on the facility site would be 13,632 bushels of wheat annually, in a worst case situation analysis, for the life of the facility.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur, also of undetermined length until final siting of the facility would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Erosion losses due to wind and water from ground disturbed during the construction phase of the facility, given State permitting stipulations, would not be significant. Regionally, the agricultural production foregone on the 960 acre facility site also would not be significant. Because of the highly-buffered soils in the tract area and downwind, no significant impacts to soils are expected from acid rains.

There is evidence documented in the literature (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978) that there are potential negative impacts to vegetation and to livestock downwind from such a facility due to nitrogen oxides, sulfur dioxide and particulate matter. Such negative impacts would be analyzed in detail at such a time as more specific information becomes available in conjunction with facility permit application with the State permitting authority.

Water

Water requirements for an indirect liquefaction facility are approximately 7,800 gallons per minute or 11,500 acre feet per year. The likely source of water for industrial use is Fort Peck Reservoir. Withdrawal of water would have no significant impact upon the reservoir. Facility wastes of ash, sludge and water disposed of in the mine do have the potential to degrade water quality if they are disposed of within the saturated zone which develops upon reclamation. Present regulations require state approval of disposal sites.

Land Use

Changes in land use include displacement of existing use, increased intensity of existing uses and the introduction of new uses. The site of the facility is likely to displace agricultural use.

The optimum site conditions for facilities are the same as for agriculture, that is: gentle topography and soils with good drainage characteristics. The increase in

population of communities results in demand for new housing, additional commercial development and expanded public use facilities. The area of this development will likely be on off-site agricultural land. The on-site displacement of agricultural land use is discussed in the Agriculture section of this report.

Increased population would create a demand for community services as addressed in the Economics and Social Conditions section of this report. This demand implies a need to expand existing facilities and commercial establishments or to create new ones. Existing commercial establishments may suffer through the construction of new facilities outside the downtown areas. Public services would be stretched in the short term by lack of capital to implement change due to increased population. Parking shortages, traffic congestion and excessive wear and tear on roadways would make downtown areas less habitable. Municipal organizational structures and physical space may prove inadequate with increased population. For example: a part time mayor may be overworked, processing of permits may delay private building construction and filing space for public records may prove inadequate.

With the influx of workers and their families, a change in the composition of the community is inevitable and demands for new forms of public and commercial facilities for shopping, recreation, entertainment would ensue. These types of changes are likely to result in dissatisfaction by both the existing resident population and by the newcomers. Conflicts are likely to occur as a result of the contrast in the lifestyles of these populations.

Existing planning varies considerably from community to community. Some are prepared for change presaged by recent oil and gas development in some areas, while others are ill prepared for the change in population anticipated.

Current perception of county residents with regard to roads, retail opportunities, recreational/entertainment facilities and housing are discussed in detail in Chapter 2 of the Site Specific Analysis for Economics and Social Conditions.

Similarly, forecasts by city/county planners regarding likely changes in community services resulting from facility related population growth are presented in detail in the Economics and Social Conditions section of this report.

Recreation

Recreation in the tract vicinity is limited to dispersed seasonal big game hunting with pronghorn antelope being the predominant big game species. Access depends on landowner consent and climatic factors. Although there are no recreation facilities in the tract vicinity, existing recreation facilities in the region

(community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the majority of recreation demand from the projected population increase. The social attitude survey revealed a concern for existing recreation facilities. It was stated that an increase in population would hopefully result in the possible upgrading of already marginal recreation facilities. This concern will be addressed with the expected recreation demand from increased population in the regional EIS. There is no wilderness in the area.

Wildlife/Fisheries

Impacts of an indirect liquefaction facility on wildlife in the Circle West III tract area could occur in two areas: 1) impacts from destruction of habitat and 2) direct and indirect impacts from the increase in human population.

The removal of vegetation for a 960 acre indirect liquefaction facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. A large area south of the tract is essential antelope habitat. Golden eagle and prairie falcon nests are situated on the west and essential deer winter range occurs to the east.

If powerlines, pipelines, access and haul roads are constructed in key wildlife areas, partial or total destruction of habitat would occur depending on the magnitude of development. The worst case would destroy present wildlife populations in the area. Wildlife oriented recreation such as hunting and wildlife observation would have to be sought elsewhere. Wildlife would be impacted by eagle electrocutions on powerlines, migratory bird mortality from striking powerlines close to wetlands, road kills along transportation routes through important wildlife areas, harassment of wildlife by off-road vehicle use, increased poaching, as well as habitat destruction.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors are located in important wildlife areas and shift changes coincide with wildlife feeding periods. This situation could occur in the Circle West III tract area.

The impact to wildlife could be mitigated by: 1) siting the indirect-liquefaction plant and associated facilities with regard for critical wildlife areas, 2) adjusting work shifts to avoid feeding times of highly visible wildlife, 3) mass transportation of employees, 4) providing funds to State fish and game agencies to better control illegal shooting of wildlife, and 5) adopting a poaching clause in union contracts.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial and forage fish. Taking water from deeper non-critical areas of the reservoir could reduce or eliminate the significant impacts to fisheries.

The cumulative increases in industrial, urban and other water uses will dictate the severity of the impacts on fisheries. The cumulative impact will be addressed in the regional EIS to be prepared.

Cultural Resources

The Circle West III tract area has not been inventoried to date. Information from existing inventories (BLM unpublished data, Davis 1976; Greiser 1980) outside the Fort Union coal region suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80%). Other expected prehistoric resources include stone circles (ca. 10%-20%), ceramic bearing sites, rockshelters and kill sites (ca. 10% combined). Expected historic resources include homestead and ranching remains (ca. 50%), historic graffiti and rock art (ca. 20%), freight roads, dugouts, cairns, trading pots, burials and battle sites (ca. 30% combined). Further information on cultural resource occurrence, distribution and significance cannot be quantified prior to inventory.

Visual Impacts

Eastern Montana has very high but common visual quality. In the absence of other types of visual experiences, the landscape is not highly valued as scenery because of the vast distances involved in crossing this relatively uniform area. Most highways roll with the landform so views alternate between nearby features at low points and panoramas of up to thirty miles at high points in the roadway profile. The landscape is seen in terms of these short vistas of landscape elements that will not be seen again, and short duration views of distant landscapes in which any vertical object or landscape feature serves as a focal point.

Large structural features in the Eastern Montana landscape contrast with the landscape both in terms of the visual surface (the character of what is seen) and in terms of function. Vertical and linear components of a facility, because of hard architectural edges of the structures, and the transitory nature of panoramic views imply a visual importance of these large objects for orientation. The aesthetic response is secondary to this visual function.

Neglecting cultural bias, the aesthetic response to stark architectural lines and pure planes of color contrasting with the simple curvilinear landforms of the countryside can be considered positive. This visual experience would be immediately comprehensible and would pro-

vide relief from a relatively uniform countryside. Beyond this initial response, however, are responses with origins in cultural bias and the individuals' relationships to the land. The greatest effect would be upon local residents with memories of the existing landscape to use as a comparative basis of judgment. If no attachment to the existing landscape is present, the facility would be judged more on its quality than on cultural bias.

The visual impact would be the penetration of the skyline by the facility in views from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away. The facility would be highly visible and would demand a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape as it now exists for the forty years of the facility's expected life.

Economics and Social Conditions

Construction and operation of the Circle West III Facility would result in impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 3 shows forecasted community employment and population levels through the year 2000 both with and without development of the facility. As these figures show, Lindsay, Glendive, West Glendive, Richey, and Circle would experience increases in both population and employment as a result of development.

Changes in regional personal income from facility development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employee's payroll expenditure and through company expenditures for goods and services during the construction

FIGURE 3

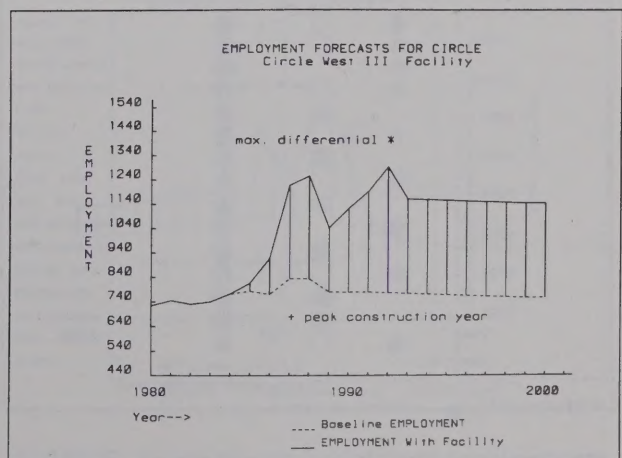


FIGURE 3 (continued)

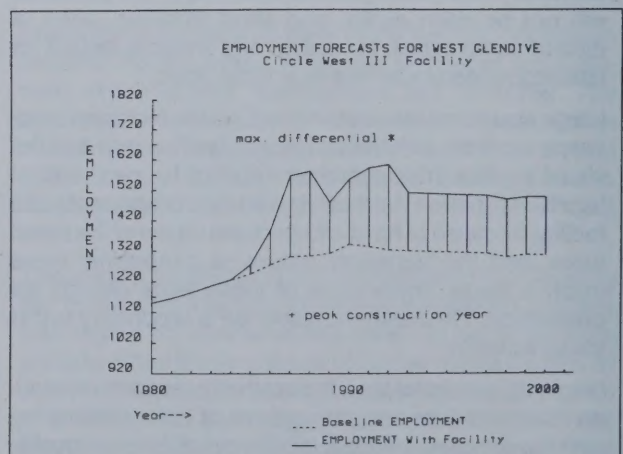
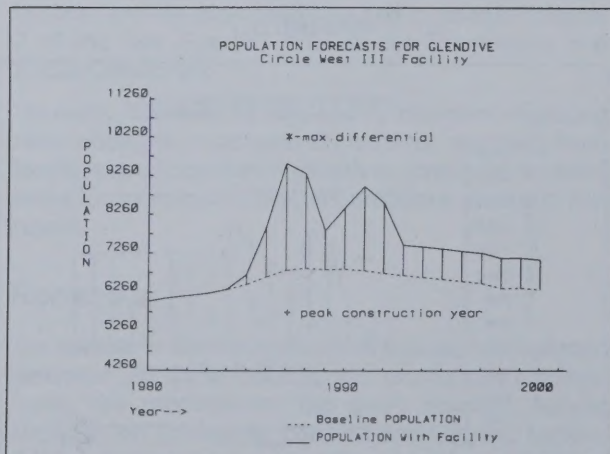
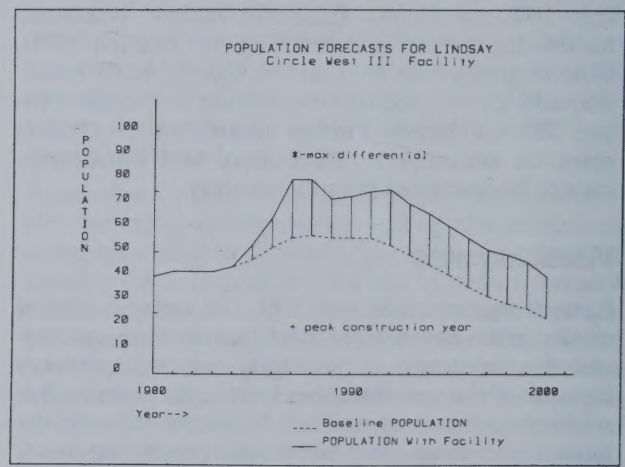
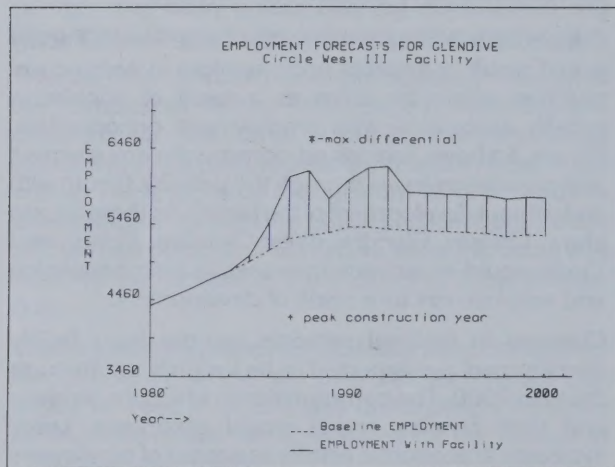
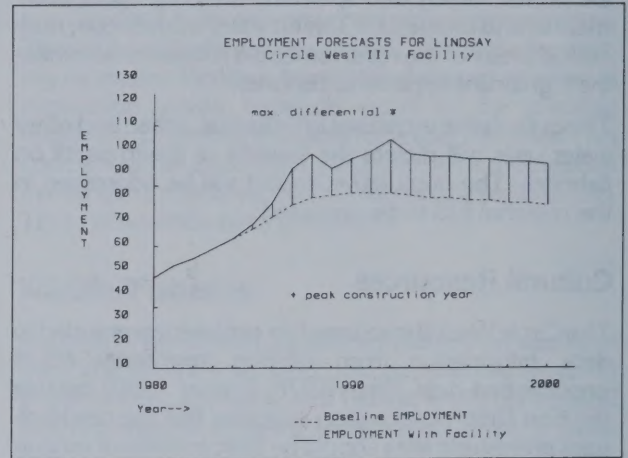
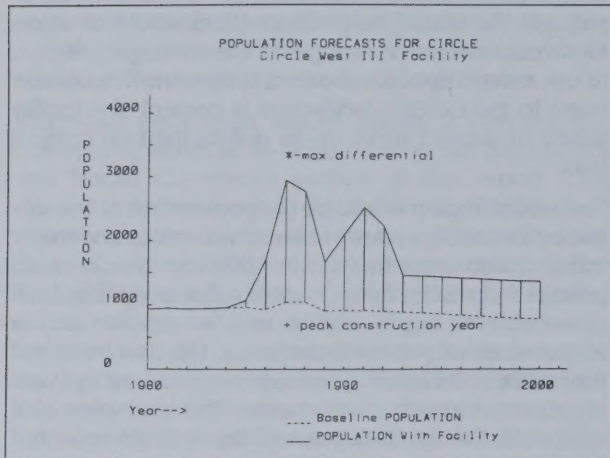
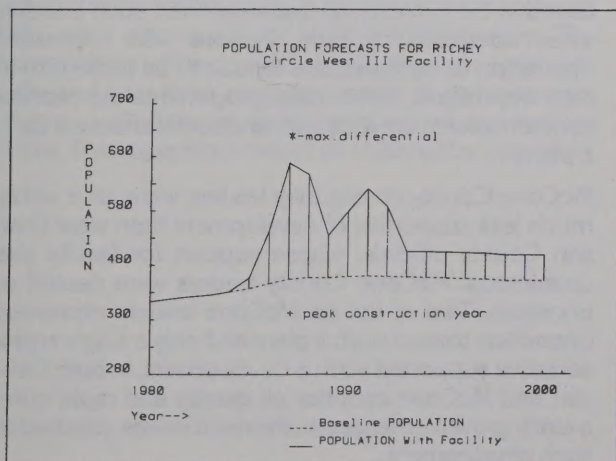
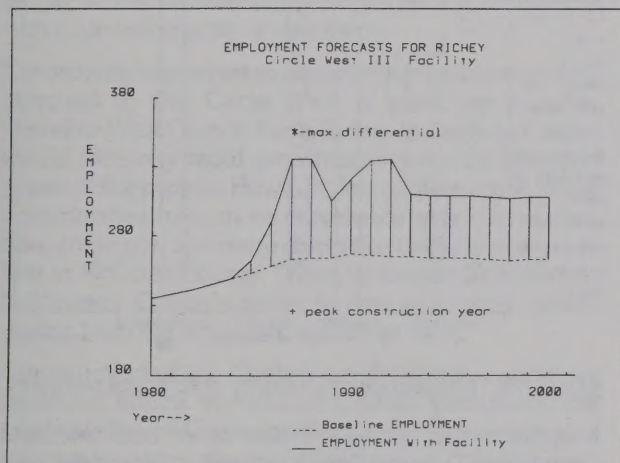
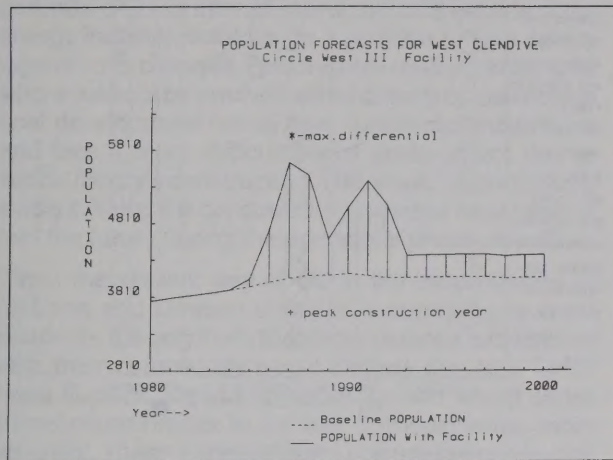


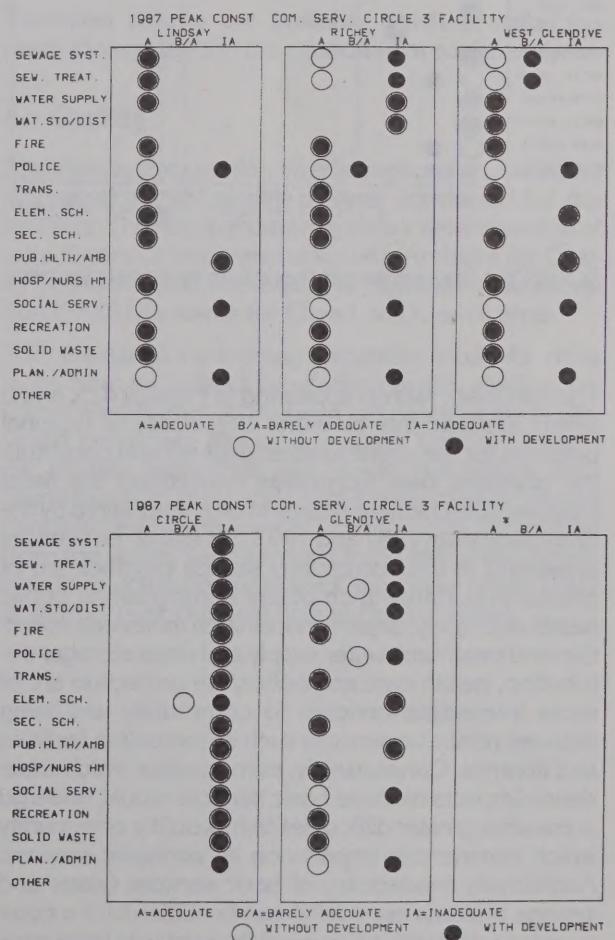
FIGURE 3 (continued)



and operation phases. The Circle West III facility is forecasted to boost regional personal income by a maximum of 3.0 percent over baseline values by 1987 as a result of expenditures associated with the construction phase of this facility.

Peak employment during the construction phase is expected to occur in 1987 at 2617 employees with full operations employment expected in 1993 at 900 employees. Using 1987 as the first primary impact date, it is estimated that the above communities would experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels associated with construction of the facility (Figure 4). West Glendive, for example, is forecasted to face inadequate police protection as a result of population growth attributable to the construction of the facility. Additionally, Brockway would experience an inadequate level of all community services by 1987 even without facility development. A facility-related population influx in this community would further exacerbate an already inadequate service situation.

FIGURE 4

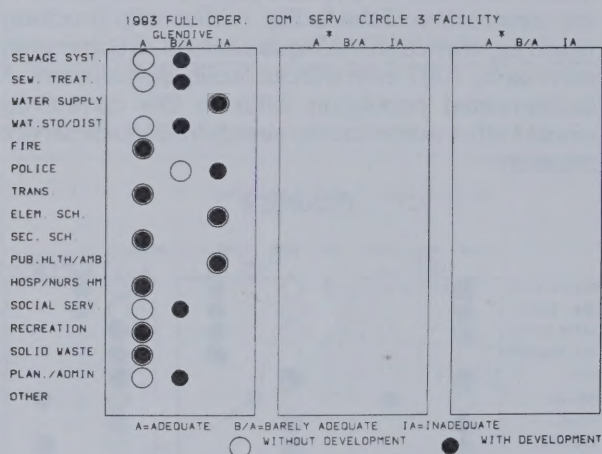


SOURCE: Mountain West Research, Inc., 1981.

SOURCE: Respective city/county or regional planners.

Full operation of the Circle West III facility (i.e., 1993 and beyond) is also expected to result in impacts on communities services. Figure 5 shows Glendive would experience inadequate police protection as a direct result of the population influx resulting from facility operation. Additionally, the following communities in the study area are forecasted to face inadequate public services by 1991 even without tract development: Brockway, Circle, Lindsay, Richey, and West Glendive. Development of the facility would further worsen an already inadequate service situation in these communities. For comparison purposes, Figure 6 shows the current (1981) public service adequacy assessments for impacted communities.

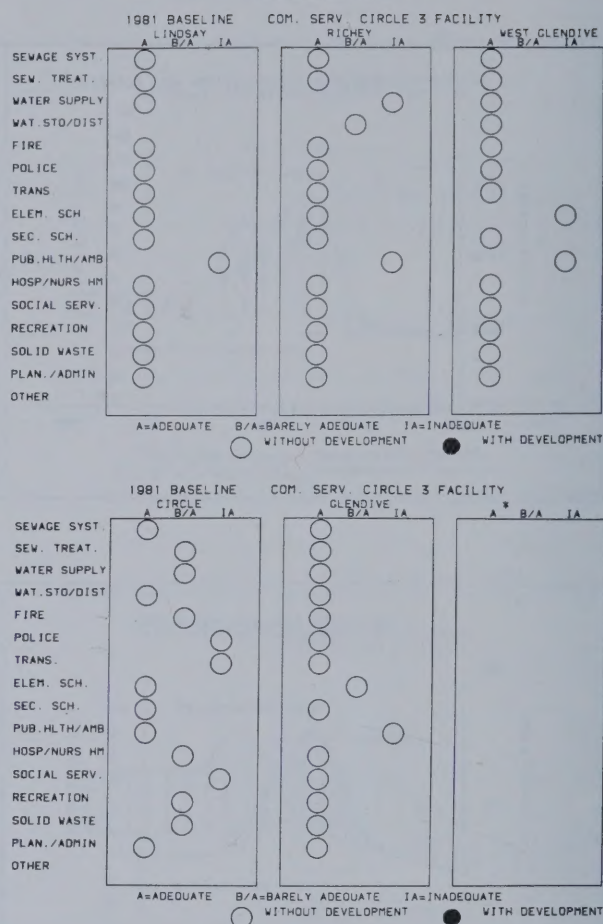
FIGURE 5



SOURCE: Respective city/county or regional planners.

The adequacy ratings appearing in Figures 4, 5, and 6 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners' best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1987 and 1993. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being than are nonbasic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its nonbasic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

FIGURE 6



SOURCE: Respective city/county or regional planners.

It appears that present residents of both McCone County and Dawson County typically endorse the construction of a coal conversion facility or facilities in the area. Roughly two-thirds of the fifty-five persons contacted in the two-county area supported such a facility when contacted by BLM. Persons who expressed opposition to such facilities tended to be more firm in their opposition, since many proponents did express concern toward the air quality and social effects of such a plant.

McCone County community leaders were, as a whole much less supportive of development than were Dawson County officials, whose support for facility was unanimous. McCone County leaders were neutral or uncertain. Two of the six McCone leaders expressed opposition toward such a plant and only a single representative supported such a development. In both Dawson and McCone counties air quality and rapid community growth emerged as the main issues attached to such development.

The consequences to individuals in McCone and Dawson counties would be unevenly distributed if a facility were to be constructed in or near the Circle West III

tract. Some persons would be unable to share in the benefits of such a facility. Others, due to their job skills, potential skills, or interest in employment outside of the energy industry, would be in a position to take advantage of such changes. Persons now residing in the area who would not be involved either directly or indirectly in coal development would bear substantial frustrations and face a more difficult social environment due to such a facility's construction. This would be particularly evident during the construction phase but would persist into the future during the operations phase as well.

Since the present way of life in the communities of McCone and Dawson counties is appealing to most residents, it is very likely that these persons' satisfaction with their community would decline due to a Circle West III plant. Rapid population growth would cause these communities to be less homogeneous, more stressful, more unpredictable, and more impersonal than they are today or would be in the future without development. Therefore, a significant impact of such a facility would be a reduction in resident's satisfaction with their community of residence.

Community capacities to absorb the population growth attached to the Circle West III plant are variable. Glendive-West Glendive and Richey in Dawson County would face very rapid growth during the construction phase of the project. However, in a relative sense, these communities have more experience with industrialization, are larger, and more diversified than are communities in McCone County. These factors would be assets in Dawson County's ability to deal with rapid growth during both the long-term and short-term.

Construction of the Circle West III facility would have profound effects in McCone County, particularly the communities of Circle and Brockway. These agricultural communities would experience, during the construction phase a level of growth that would be very difficult to bear. The introduction of such a high technology facility in this agricultural area is not consistent with either community or individual experience. The composition of the population would be changed radically and long-term residents would likely feel somewhat out of place as large numbers of newcomers arrive. This experience would be buffered by long-term,

stable relationships but, at least for the short-term construction phase, the appearance of Circle would be one of significant change.

During the operations phase, some stability would emerge in both Dawson and McCone Counties, but the labor force requirements of such a plant would be large enough so that the communities would be fundamentally altered from that which would exist without development. Changes in Circle and Brockway would be persistent and extensive. Agricultural operators and the persons attached to agriculture would no longer be dominant community factors as energy would move into prominence as part of the local economic base. This might result in reduced status for persons in agriculture and their political power would likely be reduced locally.

In brief, the Circle West III facility would have significant effects in Glendive-West Glendive during the construction phase with long-term stability expected. In McCone County, the communities of Circle and Brockway would be significantly effected, most noticeably during the construction phase, but also during the operations phase.

Technical reports are available which describe the methodology used in the economic or social analyses.

Air Quality

The introductory section on assumptions and variables discussed the air quality analysis conducted for the facilities. The result of the analysis is a determination of compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an indirect liquefaction facility sited on the Circle West III tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NO_x, and SO₂ resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

LIST OF SOURCES FOR THE PRELIMINARY FACILITY EVALUATION REPORTS

- ITAT Construction Work Force Report for February 1981; Inter-Industry Technical Assistance Team, Basin Electric Power Cooperative, Bismarck, North Dakota.
- Basin Electric Power Cooperative; 1717 East Interstate Avenue, Bismarck, North Dakota 58501.
- The Nokota Company; Suite 112, Provident Life Building, Bismarck, North Dakota 58501.
- The American Natural Resources Company, 1 Woodward Avenue, Detroit, Michigan 48226.
- Final Environmental Impact Statement for the Great Plains Gasification Project, Mercer County, North Dakota. Prepared by the U.S. Department of Energy. August 1980.
- Environmental Assessment of a Coal Gasification Complex in Dunn County, North Dakota. Prepared by the Natural Gas Pipeline Company of America.
- Identification of Synthetic Fuel Impacts: A Preliminary Assessment. Prepared for the Montana Department of Natural Resources and Conservation by teams at the University of Montana and Montana State University. August 1980.
- Montana Energy Almanac. Prepared by the Montana Department of Natural Resources and Conservation. October 1980.
- West-Central North Dakota Regional Environmental Impact Study on Energy Development. Prepared by the U.S. Department of the Interior, Bureau of Land Management and the State of North Dakota. October 1978.
- North Dakota State Department of Health; Bismarck, North Dakota.
- Montana Department of Natural Resources and Conservation; Helena, Montana.
- The Tenneco Coal Gasification Company; P.O. Box 491, Glendive, Montana 59330.

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